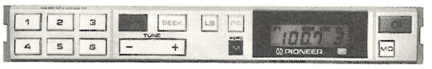
PIONEER

Service Manual



ORDER NO.
CRT-517-0

COMPONENT CAR STEREO ELECTRONIC TUNER

GEX-007(MB) EW, ES

GEX-007 EW, ES

SPECIFICATIONS

General

Power source	DC 14.4V (10.8 — 15.6V allowable)
Grounding system	Negative type
Dimensions	180(W)×25(H)×137(D) mm
Maximum output level	200 mV
Output impedance	1 kΩ
Weight	0.7 kg

FM tuner

Frequency range	87.5 — 108 MHz
Usable sensitivity	12 dBf (1.1μV/75Ω, mono)
50 dB quieting sensitivity	17 dBf (1.9μV/75Ω, mono)
Signal-to-noise ratio	70 dB (IEC-A network)
Distortion	0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response	30 — 15,000 Hz (±3 dB)
Stereo separation	40 dB (at 65 dBf, 1 kHz)

MW tuner

Frequency range	531 — 1,602 kHz
Usable sensitivity	18μV (25 dB) (S/N: 20 dB)
Selectivity	50 dB (±9 kHz)

LW tuner (EW model)

Frequency range	153 — 281 kHz
Usable sensitivity	30μV (30 dB) (S/N: 20 dB)
Selectivity	50 dB (±9 kHz)

Note:
Specifications and the design are subject to possible modification without notice due to improvements.

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1. CONNECTION

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the respective Owner's Manuals of the units to which this unit is being connected for details on correct connections.
- Be sure to correctly connect the memory power supply lead (orange) and main power supply lead (red) as specified. If the connections are made incorrectly or forgotten, this unit will make a buzzing sound and will not work at all.

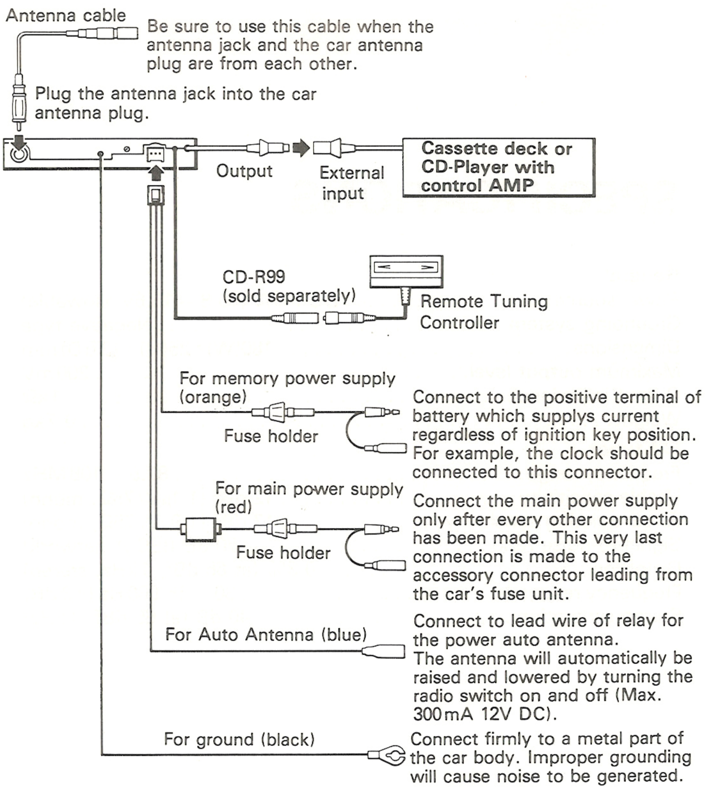

Antenna cable
Be sure to use this cable when the antenna jack and the car antenna plug are from each other.
Plug the antenna jack into the car antenna plug.
Output
External input
Cassette deck or CD-Player with control AMP
CD-R99 (sold separately)
Remote Tuning Controller
For memory power supply (orange)
Fuse holder
Connect to the positive terminal of battery which supplys current regardless of ignition key position. For example, the clock should be connected to this connector.
For main power supply (red)
Fuse holder
Connect the main power supply only after every other connection has been made. This very last connection is made to the accessory connector leading from the car's fuse unit.
For Auto Antenna (blue)
Connect to lead wire of relay for the power auto antenna. The antenna will automatically be raised and lowered by turning the radio switch on and off (Max. 300mA 12V DC).
For ground (black)
Connect firmly to a metal part of the car body. Improper grounding will cause noise to be generated.

Fig. 1

2. OPERATION

• Nomenclature and Function

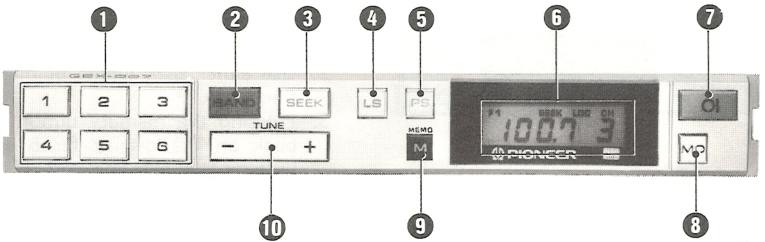


Fig. 2

❶ Preset Buttons

Tune 12 FM frequencies (6 for FM1 and 6 for FM2) and 6 MW frequencies with the touch of a button. Frequencies can be preset freely.

- 6 frequencies can be set for MW and LW in models equipped with LW.

❷ Band Select Button

Each press switches from FM1 to FM2 to MW to FM1, etc.

- Switching between FM and MW/LW on units equipped with LW is performed with the band button. Switching between MW and LW is accomplished with the tuning button. MW is 531 — 1,602 kHz, while LW is 153 — 281 kHz.

❸ Seek Button

Press to set to the SEEK position (SEEK illuminates on display) and use the tuning button for seek tuning. During seek tuning, the FM frequency changes in 50 kHz steps, while MW changes at 9 kHz steps.

- LW changes at 9 kHz steps in models equipped with LW.

❹ Local Station Button

Use this button to change the seek threshold level of the seek function. Normally, this button is kept in the OFF position. At night, when radio signal conditions are favorable, very weak signals are often detected and sought out by the seek function. Pressing this button (Note: LOC. will illuminate on the display) will raise the seek threshold level to eliminate this problem.

❺ Preset-Scan Button

Press to tune each stored frequency for 5 seconds in the order of the preset button numbers. Press once again to cancel the preset-scan function and to stay at a certain frequency.

• Reading the Displays

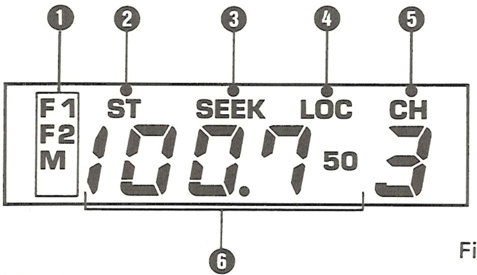


Fig. 3

❶ Band Indicator

Changes in the order of F1 → F2 → M with each press of the band select button. F1, F2 and M stand for FM1, FM2 and MW respectively.

- For models equipped with LW, switching between MW and LW is accomplished with the tuning button.

❷ FM Stereo Indicator

Lights when an FM stereo broadcast is tuned in.

❸ Seek Indicator

Lights when the seek button is pressed.

❹ Local Station Indicator

Lights when local station button is pressed.

❺ Channel Number Indicator

Corresponding channel number lights when preset button is pressed.

❻ Frequency Indicator

❻ Display

❼ Power Switch

Press to switch power ON and OFF. (The cassette deck takes priority over the tuner, so switch the cassette deck OFF when in use.)

❽ Stereo/Monaural Button

Switches an FM broadcast between stereo and monaural. Usually this button is kept in the raised, stereo position (red MO on button not lit). In this setting, stereo broadcasts will cause the stereo indicator on the display to light, and full stereo effect can be enjoyed. Automatic Reception Control (ARC) ensures constant optimal tone quality.
If excessive noise is present, pressing this button (red MO on button lit) allows monaural reception for less noise and better listening.

❾ Memory Button

❿ Tuning Button

When the seek button is in the OFF position, each press of the (+) side of this button increases the FM frequency in 25 kHz steps or MW in 9 kHz steps. Each press of the (−) side decreases the frequencies by their respective steps. Holding down either side of the button causes the frequencies to change at high speed.

- LW changes at 1 kHz steps on models equipped with LW.

• Tuning in Broadcasts

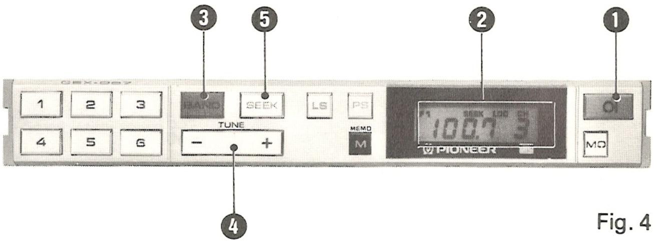


Fig. 4

1. Press the power switch ❶ to turn power ON, and the band together with the frequency will appear on the display ❷.
2. Select a band using the band select button ❸.
- For models equipped with LW, use the tuning button ❹ to select either MW or LW.
3. Select a frequency using seek, manual or one of the other tuning methods.
4. Adjust the volume, balance, bass and treble to the desired levels using the controls on the cassette deck or CD player (with control amplifier).

Seek Tuning

With the seek button ❺ in the ON position, the frequency increases when the (+) side of the tuning button ❹ is pressed and decreases when the (−) side is pressed. At this time, the next receivable broadcast is automatically tuned in.

Manual Tuning

With the seek button ❺ in the OFF position, tuning is performed pressing the (+) side and (−) side of the tuning button ❹.

- For normal seek tuning on models equipped with LW, the frequency changes at 9 kHz steps in the range of 155 — 281 kHz. Manual tuning is used to tune in the frequency of 153 kHz. Once 153 kHz is tuned, switching to seek tuning allows advancement of the frequency changes at 9 kHz steps in the range of 153 — 279 kHz. When 1,602 kHz is reached in MW, tuning wraps around to 155 kHz in LW.

• Presetting Frequencies

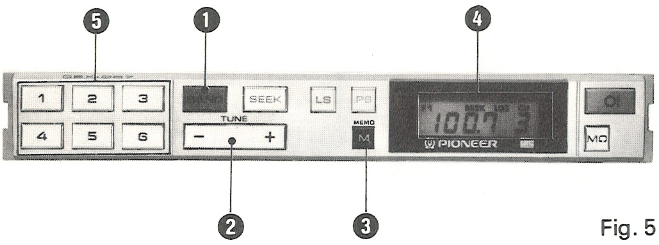


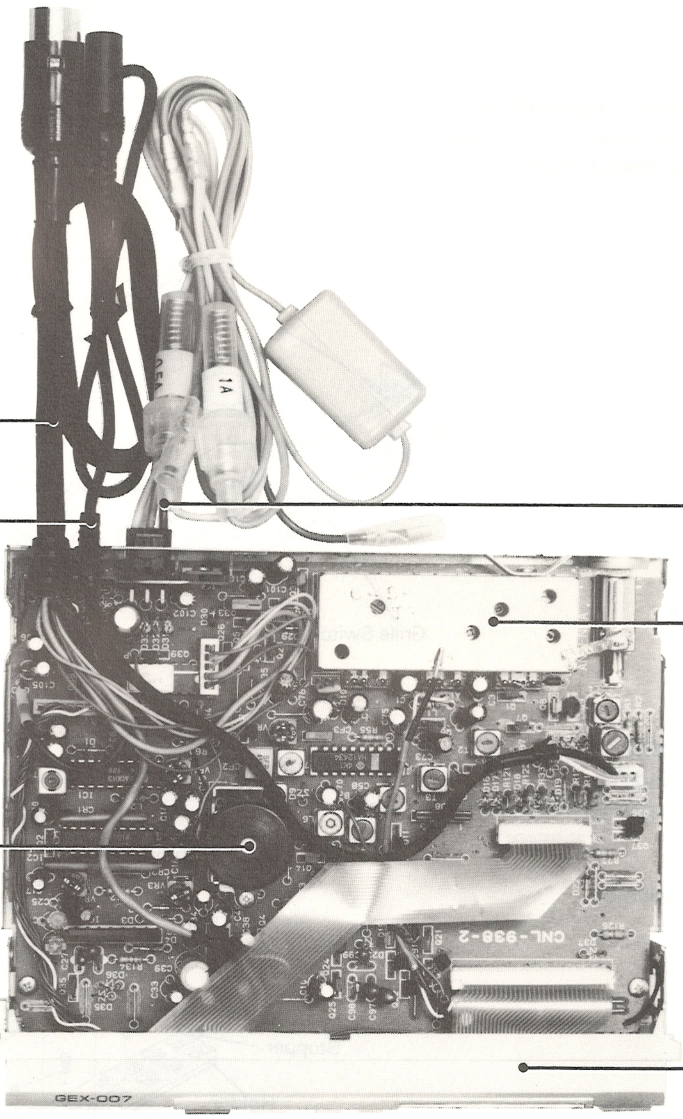
Fig. 5

1. Press the band select button ❶ until either FM or MW is selected.
- For models equipped with LW, use the tuning button ❷ to select either MW or LW.
2. Use either seek tuning or manual tuning to tune in the desired frequency.
3. Pressing the memory button ❸ will cause a preset number to blink on the display for 5 seconds. Press one of the preset buttons ❺ during this period. At this time, the channel number of the button pressed will be shown on the display ❹.
4. The preceding operation presets a single frequency to a single button. Set the other 5 buttons by repeating steps (2) and (3).

3. PARTS LOCATION

NOTE:

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
  ★ ★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.



DIN Connector Cord
CDK-112

Cord
CDK-368

Cord
CDK-308

FM Front End
CWB-172

Buzzer
CPV-031

Grille Assy
CXD-882 (GEX-007 (MB))
CXD-762 (GEX-007)

Fig. 6

4. DISASSEMBLY

• Removing the case

1. Remove three screws.

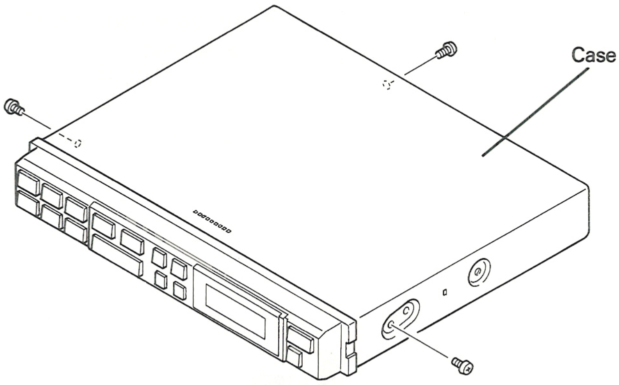


Fig. 7

• Removing the grille switch assembly

1. Lift the connector up in the direction indicated by the arrow (1), and disconnect the flexible PCB.
2. Remove two screws.

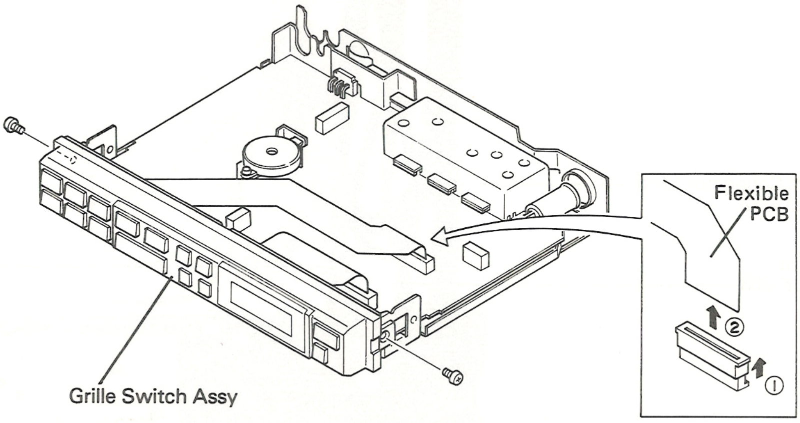

Flexible PCB
②
①
Grille Switch Assy

Fig. 8

• Removing the switch unit

1. Remove the four screws labeled A.
2. Open the stopper connected to the holder, and remove the switch unit.

• Removing the holder

1. Remove the three screws labeled B.

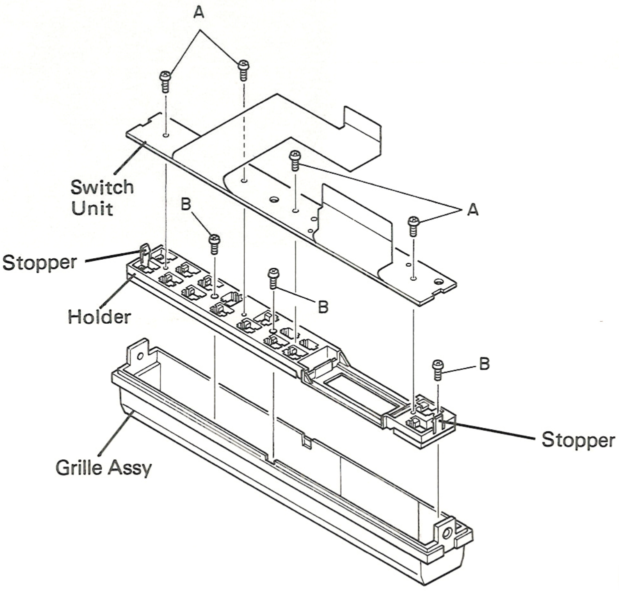

A
Switch Unit
B
A
Stopper
B
Holder
B
Stopper
Grille Assy

Fig. 9

5. CIRCUIT DESCRIPTION

• Block Diagram

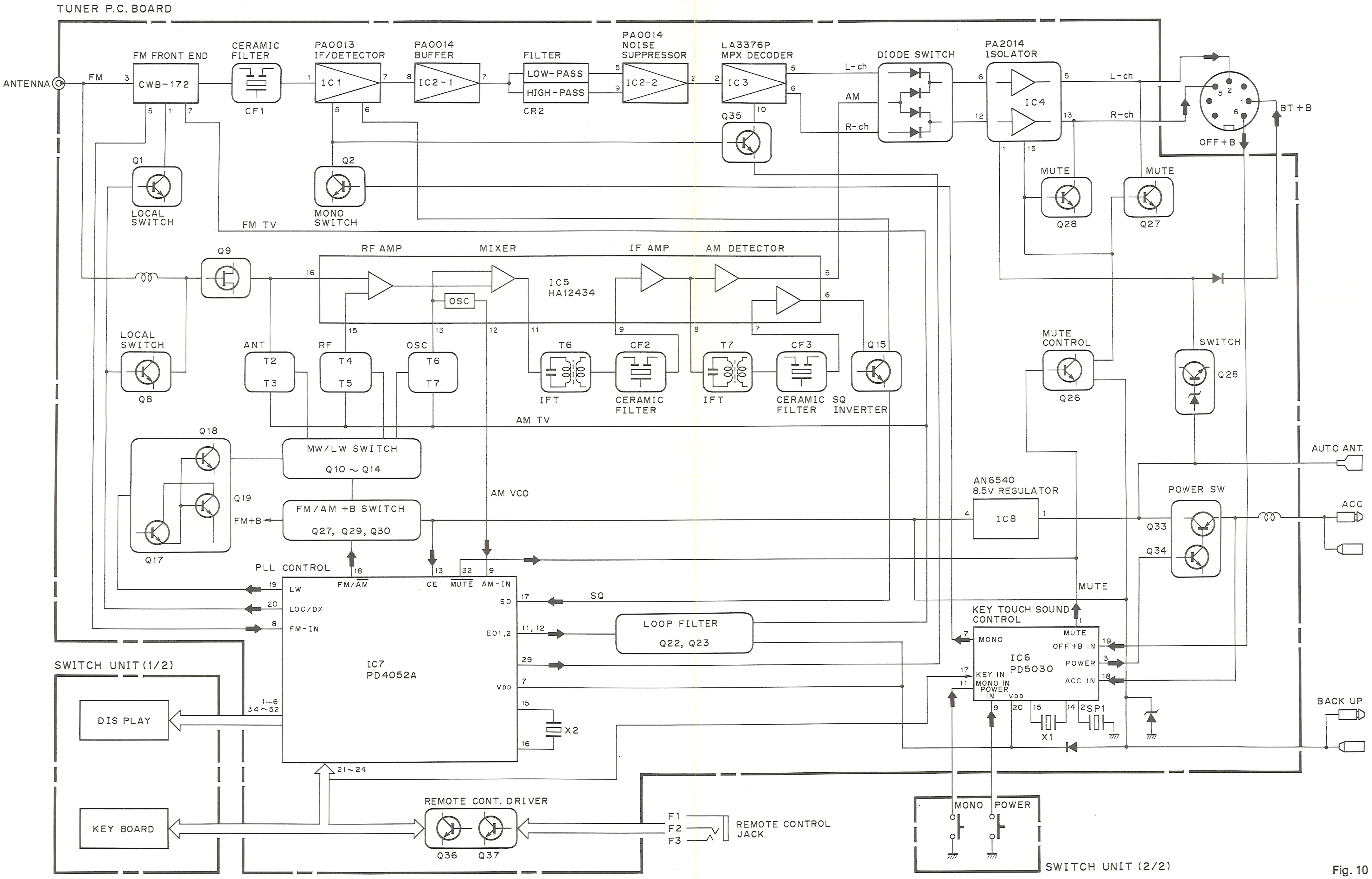

TUNER P.C. BOARD
ANTENNA
FM
FM FRONT END
CWB-172
CERAMIC FILTER
CF1
PA0013 IF/DETECTOR
IC1
PA0014 BUFFER
IC2-1
FILTER
LOW-PASS
HIGH-PASS
CR2
PA0014 NOISE SUPPRESSOR
IC2-2
LA3376P MPX DECODER
IC3
L-ch
AM
R-ch
DIODE SWITCH
PA2014 ISOLATOR
IC4
L-ch
R-ch
BT+B
OFF+B
Q35
Q1
LOCAL SWITCH
Q2
MONO SWITCH
FM TV
MUTE
Q28
MUTE
Q27
Q9
RF AMP
MIXER
IF AMP
AM DETECTOR
IC5
HA12434
OSC
LOCAL SWITCH
Q8
ANT
T2
T3
RF
T4
T5
OSC
T6
T7
T6
IFT
CF2
CERAMIC FILTER
T7
IFT
CF3
CERAMIC FILTER
Q15
SQ INVERTER
AM TV
MUTE CONTROL
Q26
SWITCH
Q28
Q18
Q19
Q17
MW/LW SWITCH
Q10 ~ Q14
FM/AM +B SWITCH
Q27, Q29, Q30
FM+B
AM VCO
AN6540
8.5V REGULATOR
IC8
POWER SW
Q33
Q34
AUTO ANT.
ACC
PLL CONTROL
FM/AM
CE
MUTE
AM-IN
LW
LOC/DX
FM-IN
SD
SQ
E01,2
LOOP FILTER
Q22, Q23
IC7
PD4052A
VDD
X2
MUTE
KEY TOUCH SOUND CONTROL
MONO
MUTE
OFF+B IN
IC6
PD5030
POWER
KEY IN
ACC IN
MONO IN
POWER IN
VDD
X1
SP1
BACK UP
SWITCH UNIT (1/2)
DIS PLAY
KEY BOARD
1~6
34~52
21~24
REMOTE CONT. DRIVER
Q36
Q37
F1
F2
F3
REMOTE CONTROL JACK
MONO
POWER
SWITCH UNIT (2/2)

Fig. 10

● Operation of FM Section

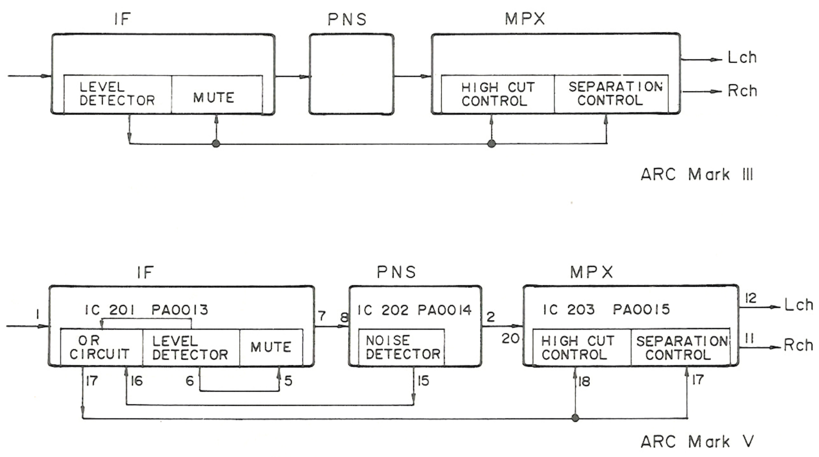


Fig. 11

ARC Mark V

The high-cut and separation, which were controlled by the input signal strength level in the ARC Mark III, can also be controlled by the noise level in the ARC Mark V. Therefore noise in strong signal areas, impossible to suppress before, can now be suppressed adequately.

Noise Detector Circuit

Co-using the PNS HIGH PASS FILTER, this operates by detecting the components above 100 kHz in the wave detector output. The HPF output is amplified to a sufficient level, rectified, phase reversed and then DC converted.

Input Level 35 dBμV Switch

The noise level ceases to control the high-cut and separation when the input level drops below 35 dBμV, and control of these is carried out entirely by the input signal strength level. This is the same as in the Mark III. This function operates in this manner because the noise level control will always output a signal when the signal strength is below 35 dBμV, and signal strength control is sufficient for medium-weak input signal areas.

1. Front end section

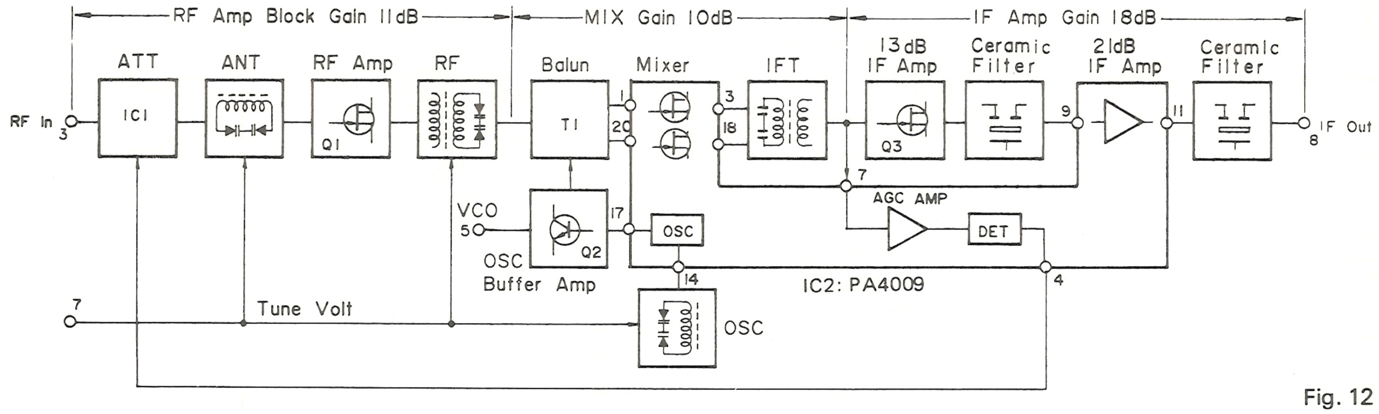


Fig. 12

The RF signal from the antenna passes through an attenuator constructed as a band-pass filter and is sent to the pi-shaped matching circuit, where high-end spurious response is improved. The signal then goes to the next stage, the RF amp. The RF amp employs a MOS FET capable of handling a wide dynamic range. The output from the RF amp passes through a parallel resonance circuit, is converted to a balanced signal from an unbalanced by a balun circuit and then goes to the mixer stage. This is a J-FET single balance type mixer which can accommodate a wide dynamic range. One of the IF signals from the mixer passes through the IF amp and ceramic filters. Another IF signal goes to the AGC amp. This AGC amp can operate even in the presence of interference signals. The AGC amp output is fed back to the RF attenuator circuit, forming a wide loop AGC. The AGC circuit operates at antenna input levels above 65 ±5 dB.

2. IF detector section

A single-tuning quadrature detection is performed by IC PA0013 using IF amp and T1 to obtain an audio frequency output.

3. PNS section

This is a pulse noise canceller using IC PA0014 and CR composite part CR1 which comprises filters.

4. Multiplexer section

Stereo multiplexing is performed by IC LA3376P. This IC does not operate the stereo circuit in the absence of current flowing through the stereo indicator terminal (Pin 10).

5. Muting of weak incoming signals

IC PA0013 develops a DC voltage at pin 6 when the input is weak or detuned. When this voltage is applied to pin 5 through the filter consisting of capacitors and resistors, the attenuator goes into operation. The on/off (AUTO/MONO) of this weak input signal muting is controlled.
The stop signal for the seek operation uses a voltage developed at pin 6. (During broadcast reception, the voltage is at 0V).

6. Local station seeking

While seeking strong signal stations, the gain of the front end is decreased by making the voltage at AGC terminal in the front end 4.5V by Q1.

7. Separation control, high frequency control.

Pin 8 of IC3 (LA3376P) functions as the separation control (SNC) pin, and pins 7 function as the high-cut control (HCC) pins. SNC and HCC are controlled by the control voltage from pin 17 of IC1 (PA0013). The control voltage can be varied by adjusting semi-fixed volume VR1, connected to pin 20 of IC1. SNC and HCC are controlled by the input signal strength level. However, these are also controlled by the noise detector level from IC2 (PA0014, PNS), unless the input signal strength is below 35 dBμV. The noise detector output from pin 7 of CR1 is input to pin 16 of IC1. The noise detector control of the high-cut and separation will switch on above 35 dBμV.

8. Mono/stereo

When the Mono switch is turned on, pin 10 of IC3 (LA3376P) will be opened, the stereo indicator will go out, and the output will switch to monaural. Pin 5 (MUTE DRIVE PIN) of IC1 (PA0013) will also be grounded, disengaging the level mute.

● Operation of AM Section

IC HA12434 used in this unit is designed for electronic tuning and provided with the output circuit of the stop signals for seeking and VCO buffer. Its feature includes a wide-band AGC.

1. RF amplifier section

This section performs a single-tuning 2-stage RF amplification. The first stage is a narrow-band amplifier section consisting of Q9 and its load, i.e., resonance circuit (inductance of T2, and capacitance of varicap diode D8-1, C51). The second stage is a section consisting of RF amplifier 1 inside the IC and its load, or resonance circuit (inductance of T4, and capacitance of D8-2, C54). Pin 15 is not only a terminal lead to which the load of RF amp 1 is connected, but also an input terminal pin of the mixer input.

2. VCO section

The VCO (voltage-controlled oscillator) oscillates at its resonant frequency by the feedback circuit from pin 12 to pin 13 and the resonant circuit connected to pin 13. The resonant frequency is determined by the inductance of L6 and the composite capacitance of C_A, C_B, and D8-2.
C_A is a padding capacitor connected in series with capacitance-varying varicap diode D8-3, and C_B is a capacitor connected in parallel with varicap diode depending on its grade. All this contributes to better tracking with the RF stage.

3. Mixer section

The VCO output frequency from the VCO section and the input signal from RF amp 1 are mixed together at the mixer section to produce the IF component (450 kHz).

4. IF section

The intermediate frequency section consists of the IF filter (450 kHz) by T6 and CF2, the IF amp 1 and the IF filter by T7. Pin 8 is not only a load connecting terminal of the IF amp but also an input terminal of detector circuit 1.

5. Detector section

Pin 8 is connected to the detector and provides an output to pin 5, audio output. This output contains both audio frequency component (AC) and DC component.

6. AGC section (AGC by the reception frequency)

The DC component of the detector output at pin 5 is detected by AGC amp 1 at pin 1 by passing it through the filter consisting of R55 and C73. The AGC starts operating at an input level close to the maximum sensitivity. The output of AGC amp 1 is connected to AGC amp 2, and controls the gain of RF amp 1.
The AGC voltage is developed at pin 3 through AGC amp 3, and current flows through D5 and D6, lowering the impedance. As a result, attenuation is effected.
When Q7 turns on and the load impedance of the drain

of Q9 is lowered, attenuation is effected. These attenuations due to the decrease in impedance enable AGC operation. The input level to develop a voltage at pin 3 is about 55 dBμV during reception of MW 999 kHz.
Thanks to the AGC operation mentioned above, the output variation characteristics against input variation are broader than the conventional AM characteristics.

7. AGC section (wide-band AGC)

The wide-band AGC is to control the gain of the RF amplifier section when the input RF level at pin 16 is high. This is intended to prevent interference due to the saturations of RF amp Q9, RF amp 1 in the IC, etc. Caused by a large input other than the reception frequency.
Operation is as follows: A DC voltage corresponding to the level of the input RF is developed at pin 2 by amplifying and detecting the RF signal from pin 16 by RF and 2 and detector 3 respectively. This is delayed by the time constant of C75 and the gain of this portion is determined by R58. By applying this DC voltage to AGC amp 2, the AGC at RF amp 1 and AGC at Q7, D5 and D6 are effected.

8. Stop signal

The stop signal for seek operation is produced by extracting the IF signal from the secondary winding of T7 and adjusting its level by VR5. This signal is connected via 450 kHz filter CF3 from pin 7 to IF amp 2 to detector 2. This output appears at pin 6 and become 0V during reception.

9. Local station/distant station seek

During local station seek, Q8 turns on, whereby C43 is grounded. The impedance of C43 allows attenuation in the antenna system.

• Frequency Synthesizer Section (FM)

During FM reception, a combination of synthesizer control IC7 (the frequency dividing ratio is controlled to 1/64 or 1/66 by IC7) allow the slower counter method.
The FM VCO is frequency-divided to a ratio of 1/64 or 1/66 by prescaler IC7.
An output of 4.5 MHz (X2) which becomes a clock pulse for IC7 is divided into 1/360 by the reference frequency divider to produce 12.5 kHz (all this is processed inside IC7). Since the reception frequency is 87.5 ~ 108.0 MHz and the intermediate frequency (IF) is 10.7 MHz, the oscillator frequency of VCO will be 98.2 ~ 118.7 MHz. As the overall frequency division ratio is 7856 ~ 9496, the output of the programmable counter inside IC7 will be 12.5 kHz. This output is compared in phase with a reference frequency of 12.5 kHz by the phase detector in IC7, and is output to pin 12 of IC7.
The loop filter consisting of Q22 and Q23 converts the signal into a DC voltage signal which in turn controls the tuning circuit in the front end section as a tuning voltage.

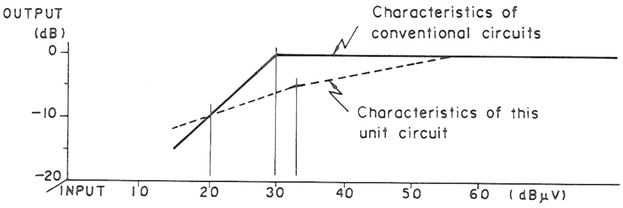


Fig. 13

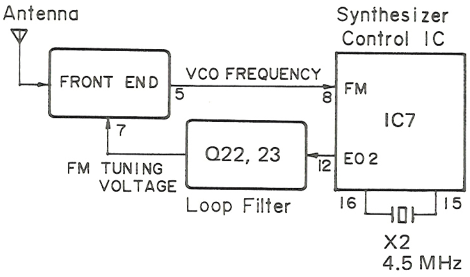


Fig. 14

● Frequency Synthesizer Section (MW)

The MW section employes a direct frequency dividing method. So that the reception frequency is incremented in 9 kHz, the frequency of the phase comparator is 9 kHz. This is produced by dividing 4.5 MHz (the output of X2), a clock frequency of IC7, to 1/500. Since the reception frequency range is 531 ~ 1,602 kHz and the intermediate frequency is selected at 450 kHz, the frequency of the local oscillator (VCO) will be 981 ~ 2,052 kHz.

This output is output from pin 12 of IC5 and enters pin 9 of IC7.

If the frequency dividing ratio of the programmable counter in IC7 is set to 109 ~ 228, the output will be 9 kHz. This frequency is compared in phase with a reference frequency of 9 kHz by the phase comparator and is output from pin 12 of IC7.

The signal is converted into a DC voltage signal by the loop filter consisting of Q22 and Q23, which in turn controls the tuning circuit as a tuning voltage.

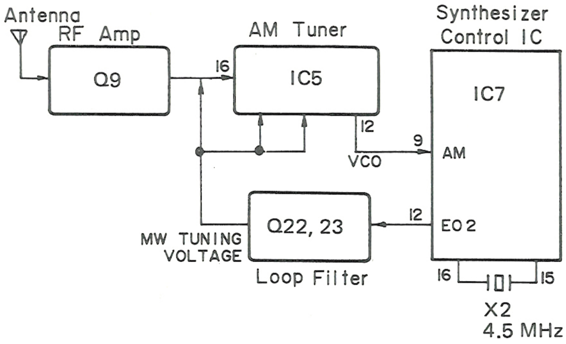

Antenna
RF Amp
Q9
16
AM Tuner
IC5
12
VCO
Synthesizer Control IC
IC7
9
AM
12
EO 2
Q22, 23
Loop Filter
MW TUNING VOLTAGE
16
15
X2
4.5 MHz

Fig. 15

● The Functions of Control IC (PD4052A)

PD4052A is a 52-pin flat package C-MOS LSI which controls 25kHz incremental tuning for FM, 9kHz incremental tuning for AM. This PLL type frequency synthesizer tuner control IC makes possible 7-segment digital display. Since this IC employs a static method for the display driver, the performance of the receiver is improved.

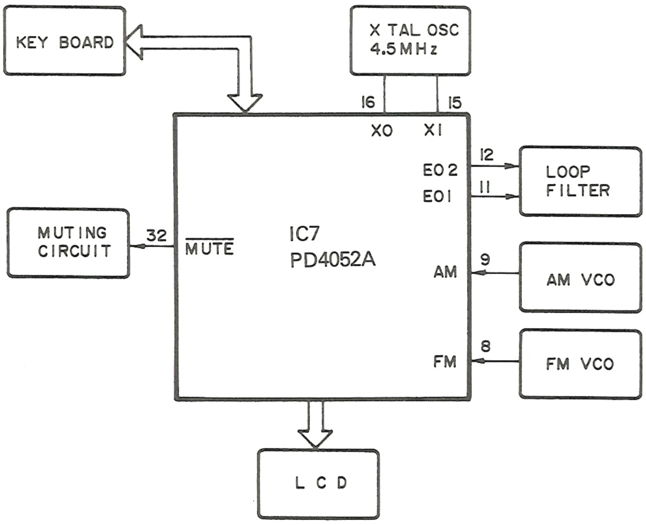

KEY BOARD
X TAL OSC 4.5MHz
16
15
XO
XI
EO 2
EO I
12
11
LOOP FILTER
MUTING CIRCUIT
32
MUTE
IC7
PD4052A
AM
9
AM VCO
FM
8
FM VCO
L C D

Fig. 16

● Frequency Synthesizer Section (LW)

The LW section employs a direct frequency dividing method. So that the reception frequency is incremented in 1 kHz, the frequency of the phase comparator is 1 kHz. This is produced by dividing 4.5 MHz (the output of X2), which is a clock frequency of IC7, into 1/4500.

Since the reception frequency range is 153 ~ 281 kHz and the intermediate frequency is selected at 450 kHz, the frequency of the local oscillator (VCO) is 603 ~ 731 kHz. This output is output from pin 12 of IC5 and enters pin 9 of IC7.

IF the frequency dividing ratio of the programmable counter in IC7 is set to 603 ~ 731, the output frequency is 1 kHz. This is compared in phase with a reference frequency of 1 kHz by the phase comparator and is output from pin 11 of IC7. The output signal is converted into a DC voltage signal by the loop filter consisting of Q22 and Q23, which in turn controls the tuning circuit as a tuning voltage.

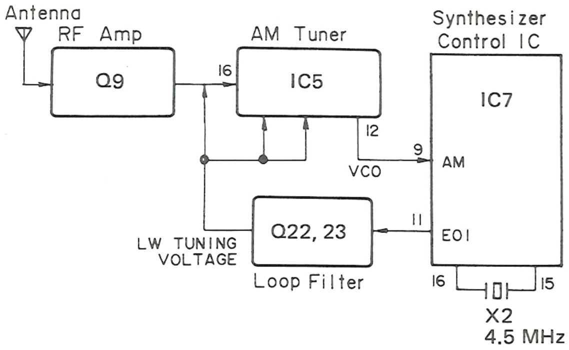

Antenna
RF Amp
Q9
16
AM Tuner
IC5
12
VCO
9
Synthesizer
Control IC
IC7
AM
EO1
11
Q22, 23
Loop Filter
LW TUNING
VOLTAGE
16
15
X2
4.5 MHz

Fig. 17

6. ADJUSTMENT

6.1 FM IF ADJUSTMENT

• Connection Diagram

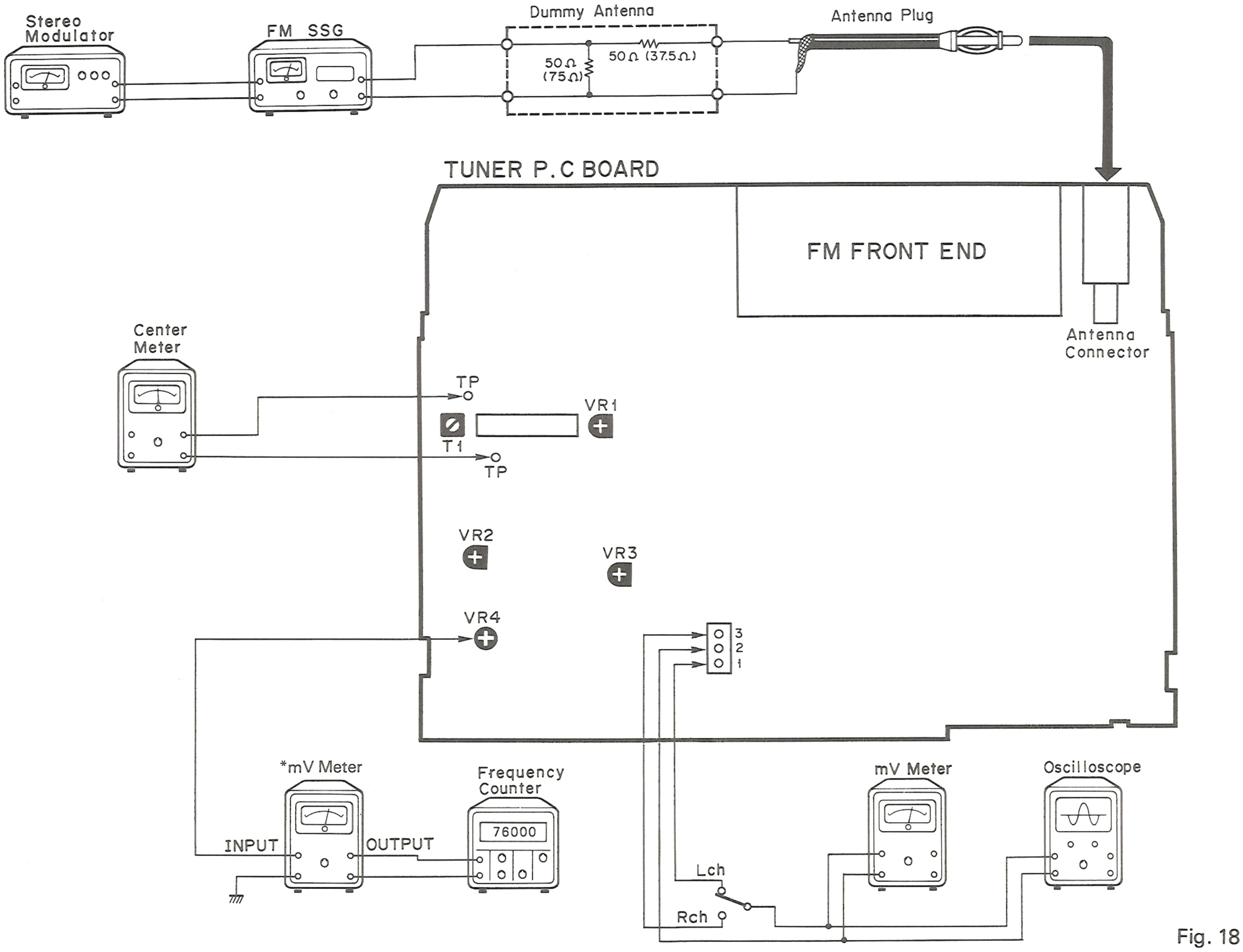

Stereo Modulator
FM SSG
Dummy Antenna
50Ω (75Ω)
50Ω (37.5Ω)
Antenna Plug
TUNER P.C BOARD
FM FRONT END
Antenna Connector
Center Meter
TP
VR1
T1
TP
VR2
VR3
VR4
3
2
1
*mV Meter
INPUT
OUTPUT
Frequency Counter
76000
mV Meter
Oscilloscope
Lch
Rch

Fig. 18

*mV Meter
Input Impedance .... more than 1 MΩ
Input Capacity.......................... less than 100pF

• To Adjust

1. Apply a 98.1 MHz, 400 Hz 100% modulated 60 dB (μV) signal from the FM SSG, and tune the tuner to 98.1 MHz.
2. Adjust T1 to obtain a 0 reading in the center meter.

6.2 FM MPX ADJUSTMENT

• Connection Diagram (Shown in Fig. 18)

• To Adjust

1. Adjust VR4 to make the frequency counter show 76 kHz ±120 Hz by applying an unmodulated signal of 98.1 MHz and 60 dB (μV) from the FM SSG.
2. Adjust VR3 to reduce the oscilloscope wave to the minimum using only the modulation for the pilot signal (10%) and 60 dB (μV).
3. Adjust VR2 to obtain the best separation by applying a stereo signal (1 kHz, 100% modulation).
4. Adjust VR1 to obtain a 5 dB separation by making the input signal 35 dB (μV).

6.3 FM TRACKING ADJUSTMENT

• Connection Diagram

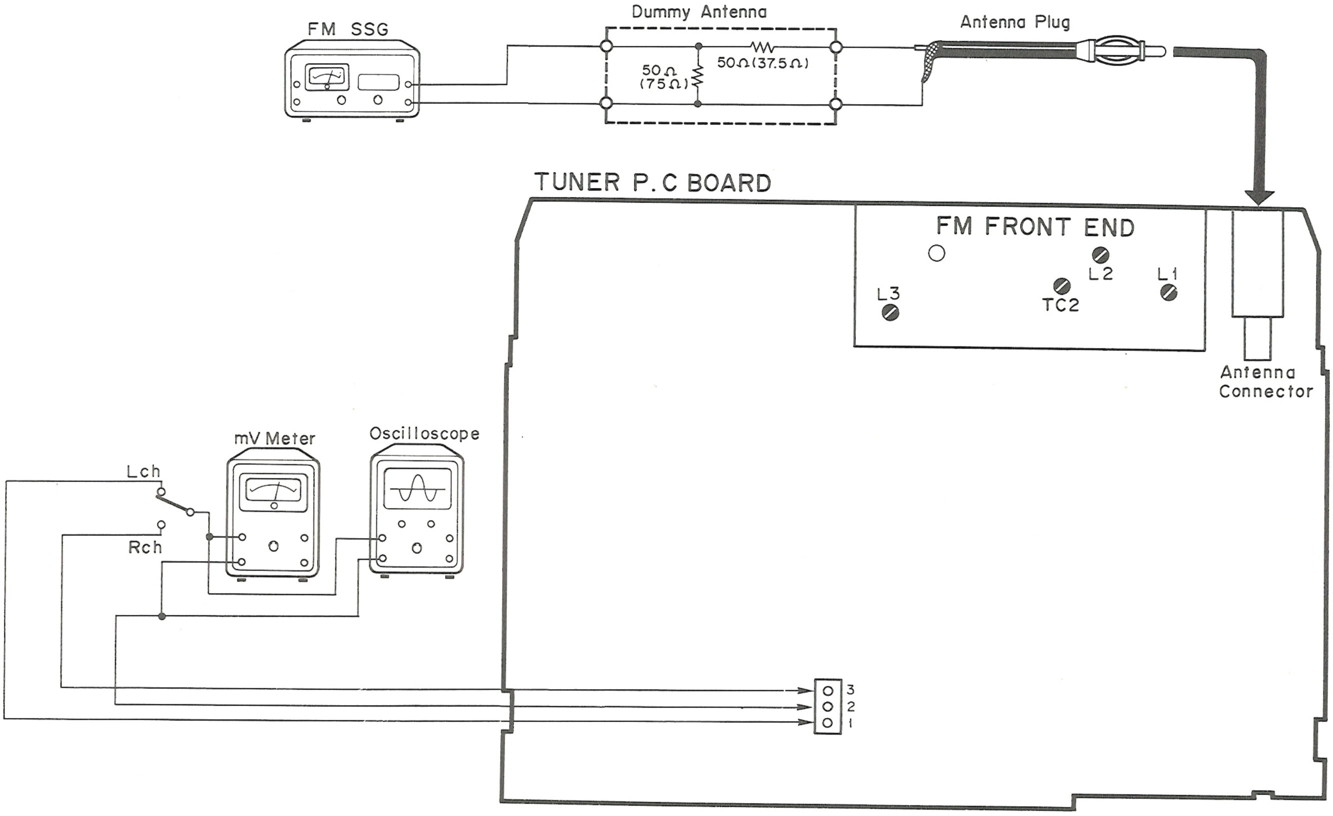

FM SSG
Dummy Antenna
50Ω (75Ω)
50Ω(37.5Ω)
Antenna Plug
TUNER P.C BOARD
FM FRONT END
L3
TC2
L2
L1
Antenna Connector
mV Meter
Oscilloscope
Lch
Rch
3
2
1

Fig. 19

• To Adjust

Frequency of FM SSG	Displayed Frequency	Adjusting Point	DC V Meter	mV Meter
1.	107.9 MHz	L3	7.6±0.3V	
2.	88.1 MHz	For confirmation Only	2.2±0.5V	
3. 90 MHz (400 Hz, 100% modulation) output level 10 dB (μV)	90 MHz	L1, L2		Maximum output
4. 106 MHz (400 Hz, 100% modulation) output level 10 dB (μV)	106 MHz	TC2		Maximum output
5. Repeat items (3) and (4) alternately so that the mV meter indicates maximum output.				

6.4 AM TRACKING ADJUSTMENT

• Connection Diagram

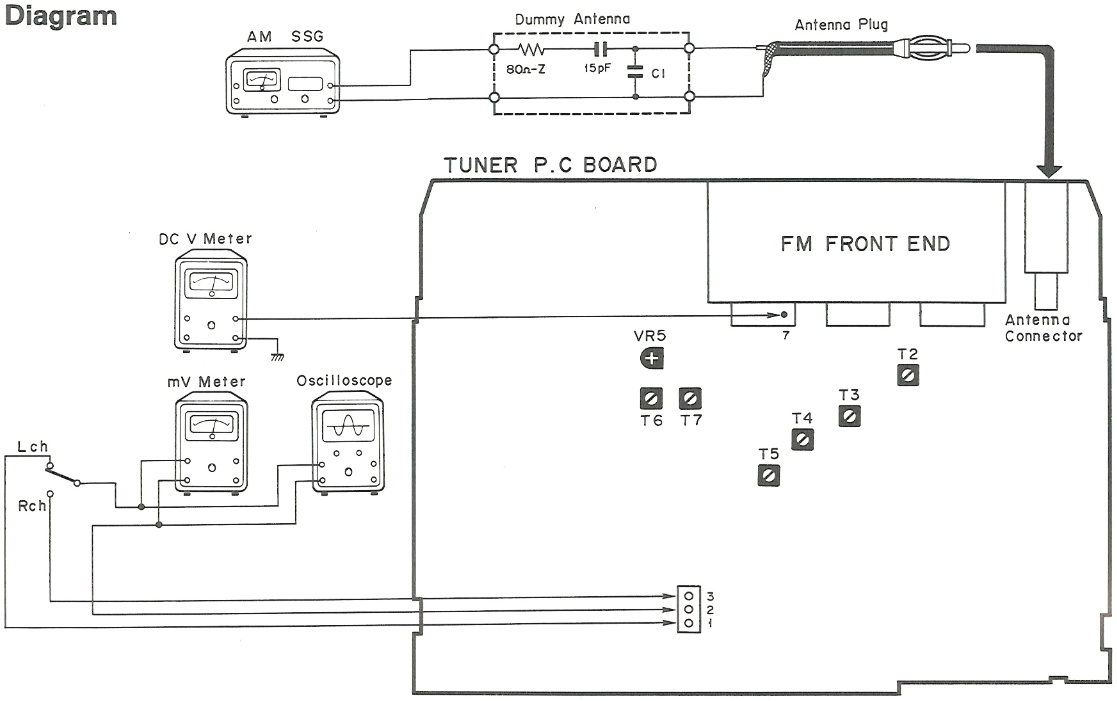

AM SSG
Dummy Antenna
80Ω-Z
15pF
C1
Antenna Plug
TUNER P.C BOARD
FM FRONT END
DC V Meter
7
Antenna Connector
VR5
T2
T3
T4
T5
T6 T7
mV Meter
Oscilloscope
Lch
Rch
3
2
1

Fig. 20

NOTICE:
Select C1 so that the total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of the SSG.

• To Adjust (In case of MW)

Frequency of AM SSG	Displayed Frequency	Adjusting Point	DC V Meter	mV Meter
1. 999 kHz (400 Hz, 30% modulation) output level 25 dB (μV)	999 kHz	T6, T7		Maximum output
2.	531 kHz	For Confirmation Only	More than 0.8V	
3. 603 kHz (400 Hz, 30% modulation) output level 25 dB (μV)	603 kHz	T2, T4		Maximum output
4.	1,602 kHz	For Confirmation Only	Less than 8.5V	

• To Adjust (In case of LW)

Frequency of AM SSG	Displayed Frequency	Adjusting Point	DC V Meter	mV Meter
1.	153 kHz	For Confirmation Only	More than 2.5V	
2. 218 kHz (400 Hz, 30% modulation) output level 25 dB (μV)	218 kHz	T3, T5		Maximum output
3.	281 kHz	For Confirmation Only	Less than 8.5V	

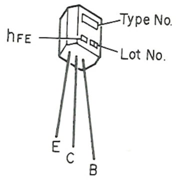
6.5 AM SEEK STOP SENSITIVITY ADJUSTMENT (Shown in Fig. 20)

• To Adjust

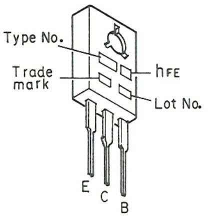
1. Apply a signal of 999 kHz, 400 Hz, 30% modulation and 25 dB (μV) from AM SSG.
2. Operate SCAN to secure VR5 within limits of 25 dB (μV) ±8 dB (μB).

• ICs and Transistors

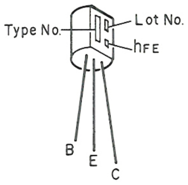
2SA1048
2SA1150
2SC2458


Type No.
hFE
Lot No.
E
C
B

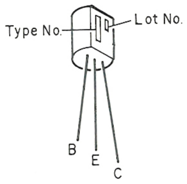
2SB772


Type No.
Trade mark
hFE
Lot No.
E
C
B

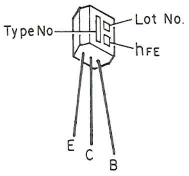
2SC2570


Type No.
Lot No.
hFE
B
E
C

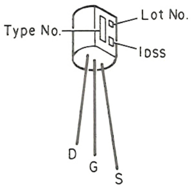
2SC2753


Type No.
Lot No.
B
E
C

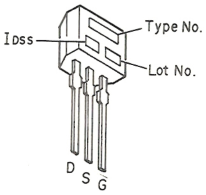
2SD1012


Type No.
Lot No.
hFE
E
C
B

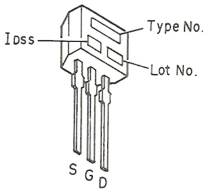
2SK163


Type No.
Lot No.
IDSS
D
G
S

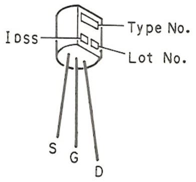
2SK241


IDSS
Type No.
Lot No.
D
S
G

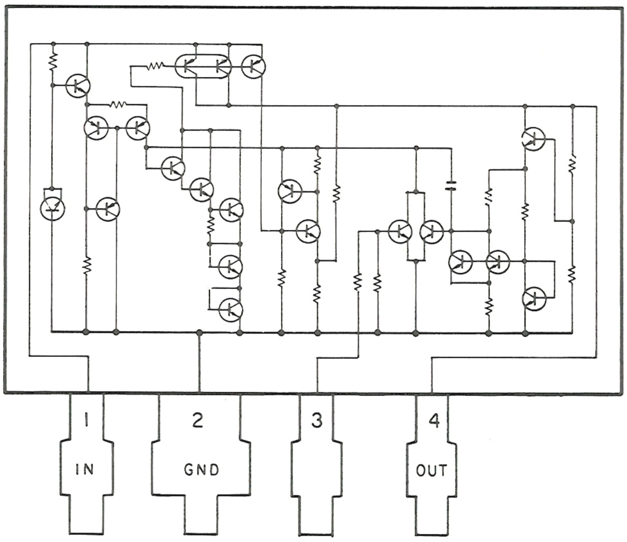
2SK330


IDSS
Type No.
Lot No.
S
G
D

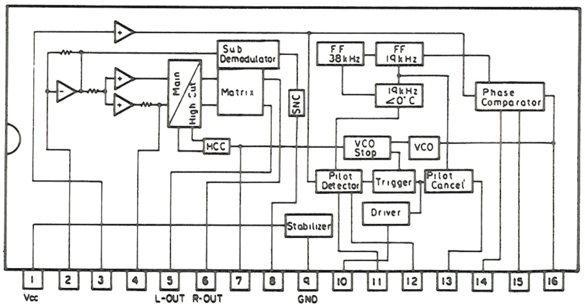
P003


IDSS
Type No.
Lot No.
S
G
D

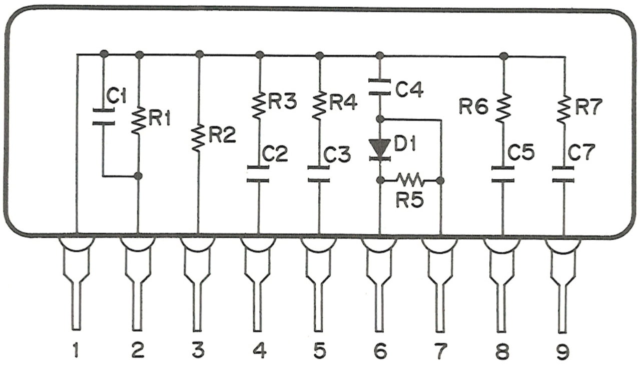
AN6540


1
IN
2
GND
3
4
OUT

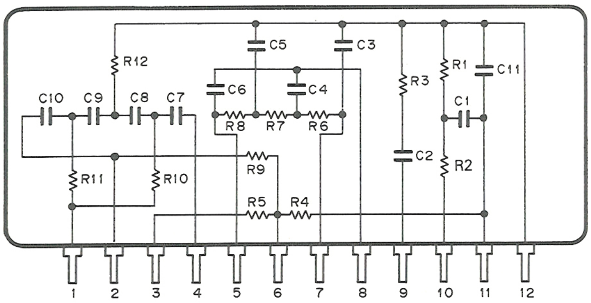
LA3376P


Sub Demodulator
FF 38kHz
FF 19kHz
Main
High Cut
Matrix
SNC
19kHz ∠0°C
Phase Comparator
HCC
VCO Stop
VCO
Pilot Detector
Trigger
Pilot Cancel
Driver
Stabilizer
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Vcc
L-OUT
R-OUT
GND

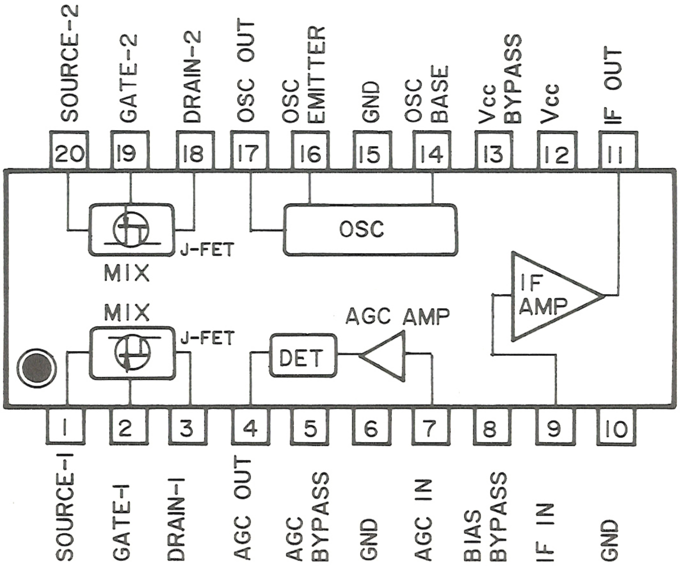
CWW-183


C1
R1
R2
R3
R4
C4
R6
R7
C2
C3
D1
C5
C7
R5
1
2
3
4
5
6
7
8
9

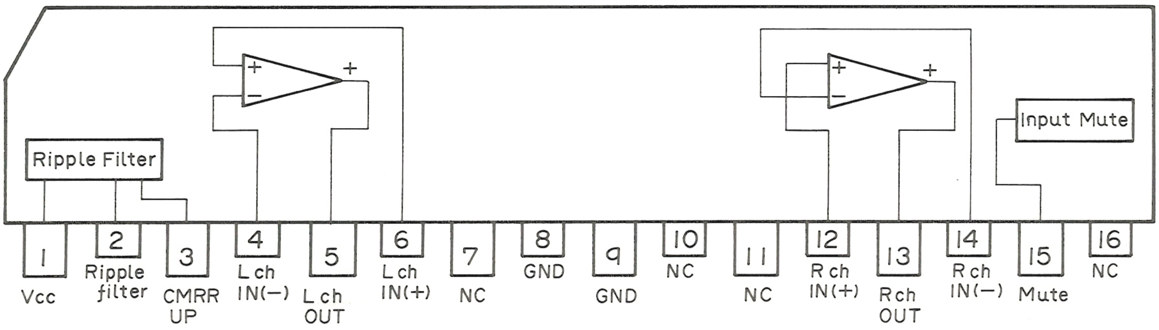
CWW-257


R12
C5
C3
R1
C11
R3
C6
C4
C10
C9
C8
C7
R8
R7
R6
C1
C2
R2
R11
R10
R9
R5
R4
1
2
3
4
5
6
7
8
9
10
11
12

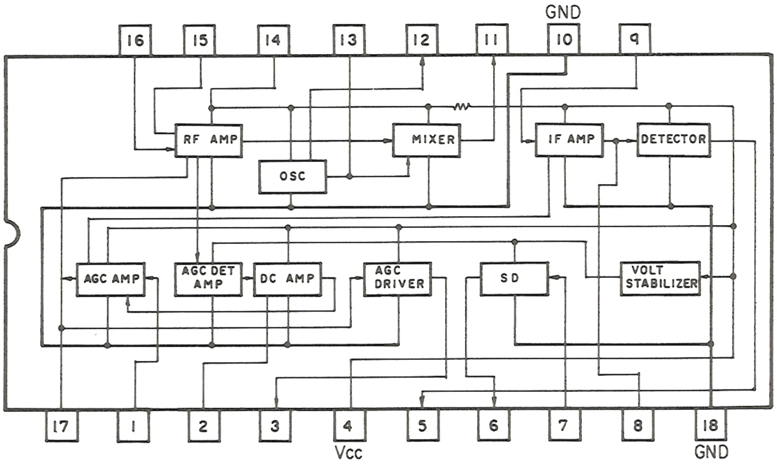
PA4009


SOURCE-2
GATE-2
DRAIN-2
OSC OUT
OSC EMITTER
GND
OSC BASE
Vcc BYPASS
Vcc
IF OUT
20
19
18
17
16
15
14
13
12
11
MIX
J-FET
OSC
IF AMP
MIX
J-FET
DET
AGC AMP
1
2
3
4
5
6
7
8
9
10
SOURCE-1
GATE-1
DRAIN-1
AGC OUT
AGC BYPASS
GND
AGC IN
BIAS BYPASS
IF IN
GND

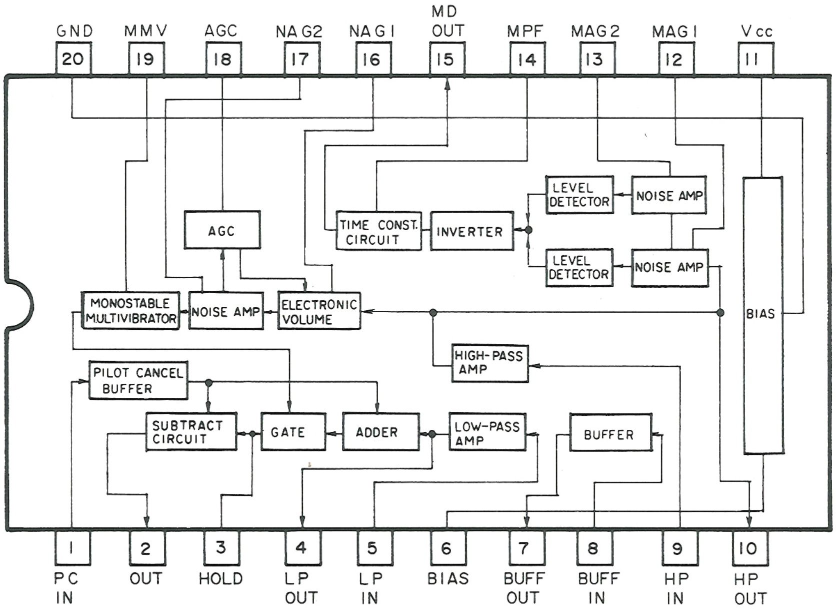
PA2014


+
−
+
+
−
+
Ripple Filter
Input Mute
1
Vcc
2
Ripple filter
3
CMRR UP
4
L ch IN(−)
5
L ch OUT
6
L ch IN(+)
7
NC
8
GND
9
GND
10
NC
11
NC
12
R ch IN(+)
13
R ch OUT
14
R ch IN(−)
15
Mute
16
NC

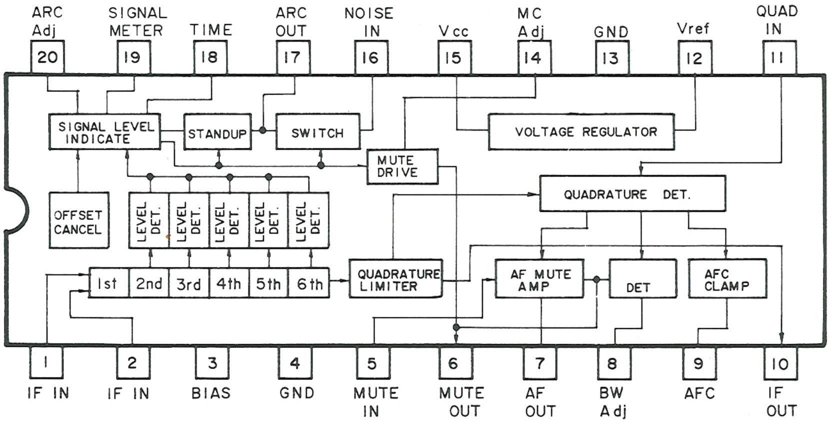
HA12434


16
15
14
13
12
11
GND
10
9
RF AMP
OSC
MIXER
IF AMP
DETECTOR
AGC AMP
AGC DET AMP
DC AMP
AGC DRIVER
SD
VOLT STABILIZER
17
1
2
3
4
Vcc
5
6
7
8
18
GND

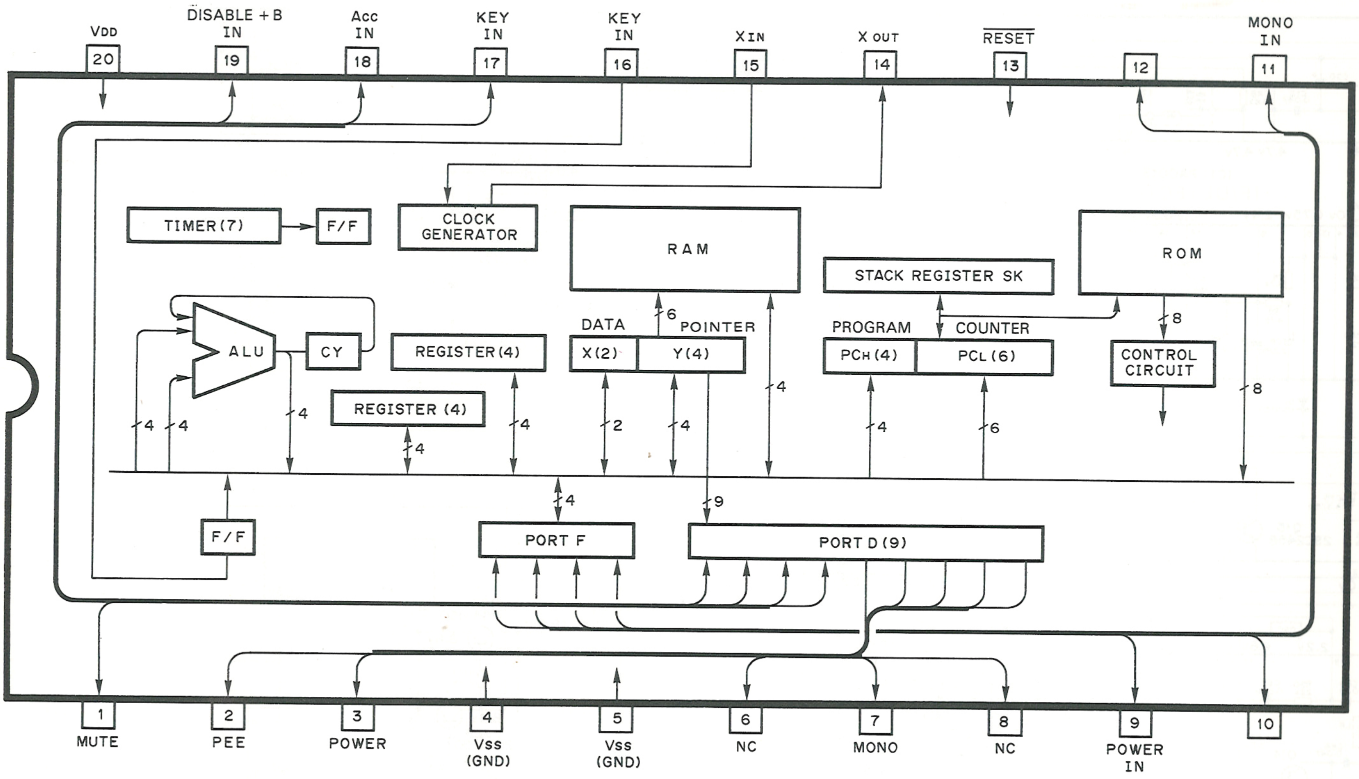
PA0014


GND
MMV
AGC
NAG2
NAG1
MD OUT
MPF
MAG2
MAG1
Vcc
20
19
18
17
16
15
14
13
12
11
LEVEL DETECTOR
NOISE AMP
TIME CONST. CIRCUIT
INVERTER
AGC
LEVEL DETECTOR
NOISE AMP
MONOSTABLE MULTIVIBRATOR
NOISE AMP
ELECTRONIC VOLUME
BIAS
HIGH-PASS AMP
PILOT CANCEL BUFFER
SUBTRACT CIRCUIT
GATE
ADDER
LOW-PASS AMP
BUFFER
1
2
3
4
5
6
7
8
9
10
PC IN
OUT
HOLD
LP OUT
LP IN
BIAS
BUFF OUT
BUFF IN
HP IN
HP OUT

PA0013


ARC Adj
SIGNAL METER
TIME
ARC OUT
NOISE IN
Vcc
MC Adj
GND
Vref
QUAD IN
20
19
18
17
16
15
14
13
12
11
SIGNAL LEVEL INDICATE
STANDUP
SWITCH
VOLTAGE REGULATOR
MUTE DRIVE
QUADRATURE DET.
OFFSET CANCEL
LEVEL DET.
LEVEL DET.
LEVEL DET.
LEVEL DET.
LEVEL DET.
LEVEL DET.
1st
2nd
3rd
4th
5th
6th
QUADRATURE LIMITER
AF MUTE AMP
DET
AFC CLAMP
1
2
3
4
5
6
7
8
9
10
IF IN
IF IN
BIAS
GND
MUTE IN
MUTE OUT
AF OUT
BW Adj
AFC
IF OUT

*PD5030


VDD
20
DISABLE +B IN
19
Acc IN
18
KEY IN
17
KEY IN
16
X IN
15
X OUT
14
RESET
13
12
MONO IN
11
TIMER (7)
F/F
CLOCK GENERATOR
RAM
STACK REGISTER SK
ROM
DATA
6
POINTER
PROGRAM
COUNTER
8
ALU
CY
REGISTER (4)
X (2)
Y (4)
PCH (4)
PCL (6)
CONTROL CIRCUIT
REGISTER (4)
4
2
6
8
F/F
PORT F
PORT D (9)
9
1
MUTE
2
PEE
3
POWER
4
Vss (GND)
5
Vss (GND)
6
NC
7
MONO
8
NC
9
POWER IN
10

• Pin Functions (PD5030)

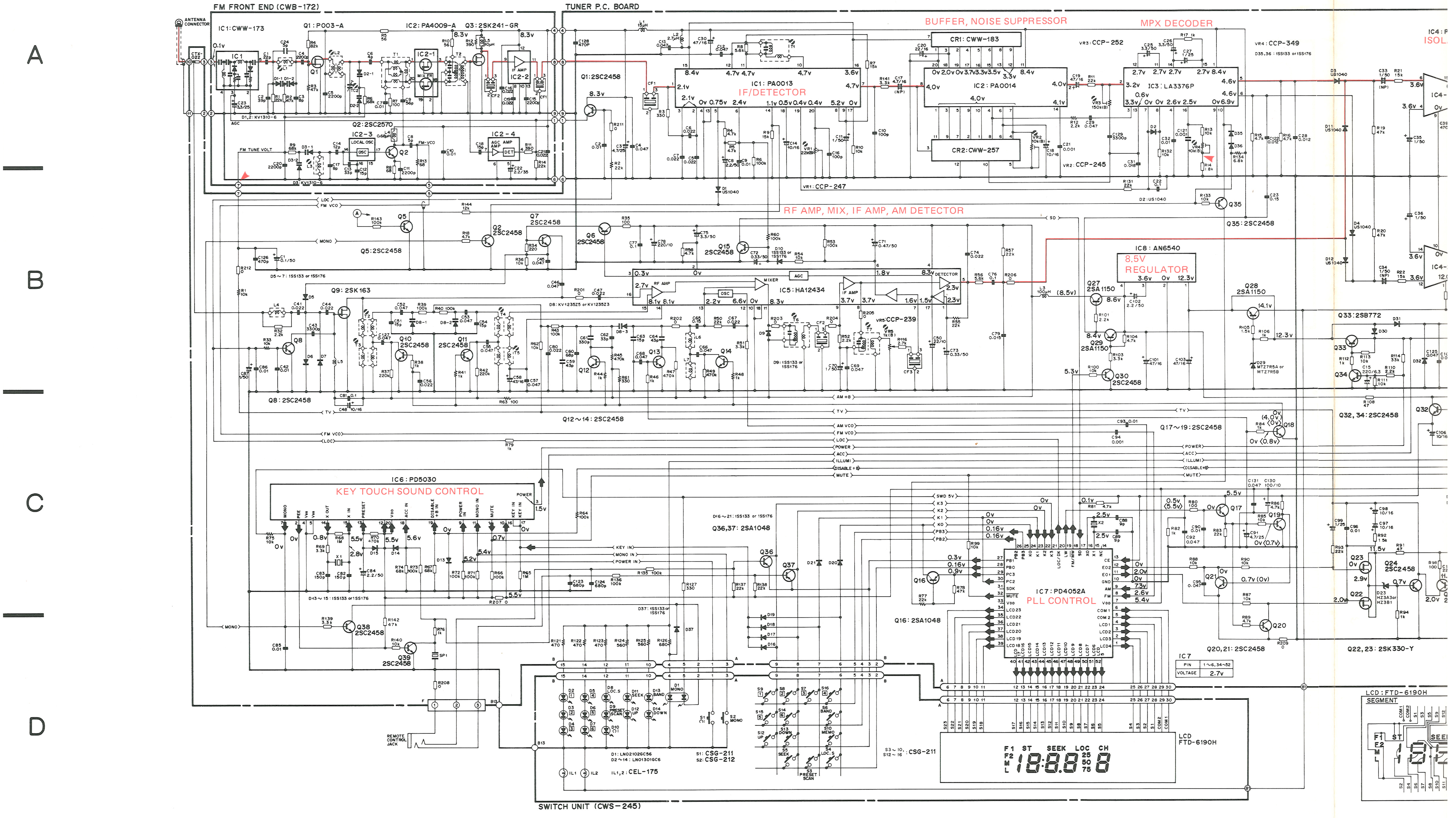
Pin	Pin Name	I/O	Function and Operation
1	MUTE	OUT	Muting output (active high)
2	PEE	OUT	Outputs a beep sound (4.5kHz, 30msec) at each input to either pin 16 or pin 17.
3	POWER	OUT	Power supply control output (active high); the state of this pin reverses at each input to pin 9.
4	Vss		Ground
5	Vss		Ground
6	NC	OUT	Not used
7	MONO	OUT	FM MONO/ST switching output; "H" when in the MONO mode, and the state reverses at each input to pin 11.
8	NC	OUT	Not used
9	POWER IN	IN	Power switch input (active L)
10		IN	Not used (pull-up high)
11	MONO IN	IN	MONO switch input (active L)
12		IN	Not used (pull-up high)
13	$\overline{\text{RESET}}$	IN	Reset input (active low)
14	X_{OUT}	OUT	Ceramic resonator output (400kHz)
15	X_{IN}	IN	Ceramic resonator input (400kHz)
16	KEY IN	IN	Key touch input; level input (active high)
17	KEY IN	IN	Key touch input; edge input (active high)
18	ACC IN	IN	ACC ON/OFF input (active high). When this pin is "L", power is off (i.e., pin 3 is "L").
19	DISABLE+B IN	IN	Disable +B input (active high). When this pin is "H", power is off (i.e., pin 3 is "L").
20	V_{DD}	IN	Pin V_{DD} +5V

*IC's marked by *are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

• Pin Functions (*PD4052A)

<table>
<tr><th>Pin</th><th>Pin Name</th><th>I/O</th><th>Function and Operation</th></tr>
<tr><td>1</td><td>LCD4</td><td>OUT</td><td rowspan="4">Pins for outputting the segment signals to the LCD panel.</td></tr>
<tr><td>2</td><td>LCD3</td><td>OUT</td></tr>
<tr><td>3</td><td>LCD2</td><td>OUT</td></tr>
<tr><td>4</td><td>LCD1</td><td>OUT</td></tr>
<tr><td>5</td><td>COM2</td><td>OUT</td><td rowspan="2">Pin for outputting the common signal to the LCD panel.
Three signals—GND, 1/2V_{DD}, and V_{DD}—are output to this pin, alternating in 50 Hz. Segment signals light when potential difference ±V_{DD} occurs between these pins and any of LCD1 through LCD23.</td></tr>
<tr><td>6</td><td>COM1</td><td>OUT</td></tr>
<tr><td>7</td><td>V_{DD}</td><td></td><td>Power supply pin; 5V±10%, internally connected to pin 33.</td></tr>
<tr><td>8</td><td>FM</td><td>IN</td><td>A local oscillation signal (VCO), 10 to 150 MHz, is input to this pin.
The signal is frequency divided by 2 through a pulse swallow circuit.</td></tr>
<tr><td>9</td><td>AM</td><td>IN</td><td>A local oscillation signal (VCO), 0.5 to 50 MHz, is input to this pin.</td></tr>
<tr><td>10</td><td>GND</td><td></td><td></td></tr>
<tr><td>11</td><td>EO1</td><td>OUT</td><td rowspan="2">Output for the charge pump of the PLL's phase detector. When the signal obtained by frequency-dividing the oscillator's signal is higher than the reference frequency, these pins become "H"; and when lower, "L."</td></tr>
<tr><td>12</td><td>EO2</td><td>OUT</td></tr>
<tr><td>13</td><td>CE</td><td>IN</td><td>Input pin for device selection.</td></tr>
<tr><td>14</td><td>NC</td><td></td><td>Not used</td></tr>
<tr><td>15</td><td>XI</td><td></td><td rowspan="2">Connected to a crystal resonator.</td></tr>
<tr><td>16</td><td>XO</td><td></td></tr>
<tr><td>17</td><td>SD</td><td>IN</td><td>Input for controlling the auto-tuning circuit. When the unit is auto-tuned to a station, a "H" is input to this pin, terminating the auto-tuning operation.</td></tr>
<tr><td>18</td><td>FM/$\overline{\text{MW}}$</td><td>OUT</td><td rowspan="2">The states of these pins determine which section of the tuner—i.e., FM, AM and LW— is provided with power as follows:
<table>
<tr><th>Band
Pin</th><th>FM</th><th>MW</th><th>LW</th></tr>
<tr><td>FM/MW</td><td>H</td><td>L</td><td>L</td></tr>
<tr><td>LW</td><td>L</td><td>L</td><td>H</td></tr>
</table></td></tr>
<tr><td>19</td><td>LW</td><td>OUT</td></tr>
<tr><td>20</td><td>LOC/DX</td><td>OUT</td><td>This pin performs LOC/DX switching. A "H" is output while the unit is auto-tuning in the LOC mode.</td></tr>
<tr><td>21</td><td>K3</td><td>IN</td><td rowspan="4">Input pins for key return signals from an external key matrix.</td></tr>
<tr><td>22</td><td>K2</td><td>IN</td></tr>
<tr><td>23</td><td>K1</td><td>IN</td></tr>
<tr><td>24</td><td>K0</td><td>IN</td></tr>
<tr><td>25</td><td>PB3</td><td>OUT</td><td rowspan="6">Pins for key return signal source; active high.</td></tr>
<tr><td>26</td><td>PB2</td><td>OUT</td></tr>
<tr><td>27</td><td>PB1</td><td>OUT</td></tr>
<tr><td>28</td><td>PB0</td><td>OUT</td></tr>
<tr><td>29</td><td>PC3</td><td>OUT</td></tr>
<tr><td>30</td><td>PC2</td><td>OUT</td></tr>
<tr><td>31</td><td>SDK</td><td></td><td>Not used</td></tr>
<tr><td>32</td><td>$\overline{\text{MUTE}}$</td><td>OUT</td><td>This pin outputs signal to mute shock noise generated when the PLL circuit is unlocked.</td></tr>
<tr><td>33</td><td>V_{DD}</td><td></td><td></td></tr>
<tr><td>34
~
52</td><td>LCD23
~
LCD5</td><td>OUT
~
OUT</td><td>These pins output segment signals to the LCD panel.</td></tr>
</table>

7. SCHEMATIC CIRCUIT DIAGRAM (/EW)


1
2
3
4
5
6
A
B
C
D
FM FRONT END (CWB-172)
ANTENNA CONNECTOR
IC1: CWW-173
Q1: P003-A
IC2: PA4009-A
Q3: 2SK241-GR
IC2-1
IC2-2
IC2-3
IC2-4
IF AMP
LOCAL OSC
AGC AMP
DET
MIX
Q2: 2SC2570
D1,2: KV1310-6
D3: KV1310-6
FM TUNE VOLT
TUNER P.C. BOARD
Q1: 2SC2458
IC1: PA0013
IF/DETECTOR
BUFFER, NOISE SUPPRESSOR
CR1: CWW-183
IC2: PA0014
CR2: CWW-257
VR1: CCP-247
VR2: CCP-245
VR3: CCP-252
MPX DECODER
IC3: LA3376P
VR4: CCP-349
D35,36: 1SS133 or 1SS176
IC4
ISOL
RF AMP, MIX, IF AMP, AM DETECTOR
Q35: 2SC2458
Q5: 2SC2458
Q7 2SC2458
Q2 2SC2458
Q6 2SC2458
Q15 2SC2458
D5~7: 1SS133 or 1SS176
Q9: 2SK163
D8: KV1235Z5 or KV1235Z3
IC5: HA12434
RF AMP
MIXER
OSC
AGC
IF AMP
DETECTOR
VR5: CCP-239
D9: 1SS133 or 1SS176
CF3
Q8: 2SC2458
Q10 2SC2458
Q11 2SC2458
Q12
Q13
Q14
Q12~14: 2SC2458
IC8: AN6540
8.5V REGULATOR
Q27 2SA1150
Q29 2SA1150
Q30 2SC2458
Q28 2SA1150
Q33: 2SB772
D29 MTZ7R5A or MTZ7R5B
Q32, 34: 2SC2458
Q17~19: 2SC2458
Q18
AM +B
TV
FM VCO
LOC
POWER
ACC
ILLUMI
DISABLE +B
MUTE
MONO
SD
IC6: PD5030
KEY TOUCH SOUND CONTROL
D16~21: 1SS133 or 1SS176
Q36,37: 2SA1048
Q36
Q37
D43~15: 1SS133 or 1SS176
D37: 1SS133 or 1SS176
Q38 2SC2458
Q39 2SC2458
KEY IN
MONO IN
POWER IN
Q16
Q16: 2SA1048
IC7: PD4052A
PLL CONTROL
IC7 PIN 1~6, 34~52 VOLTAGE 2.7V
Q17
Q19
Q20
Q21
Q20,21: 2SC2458
Q23
Q24 2SC2458
Q22
D23 HZ3A3 or HZ3B1
Q22,23: 2SK330-Y
LCD: FTD-6190H
SEGMENT
LCD FTD-6190H
F1 F2 ST SEEK LOC CH M L
REMOTE CONTROL JACK
SWITCH UNIT (CWS-245)
D1: LN02102GC56
D2~14: LN01301GC6
S1: CSG-211
S2: CSG-212
S3~10, S12~16: CSG-211
IL1,2: CEL-175
SEEK
BAND
PRESET SCAN
UP
DOWN
MEMO
LOC.S
MONO

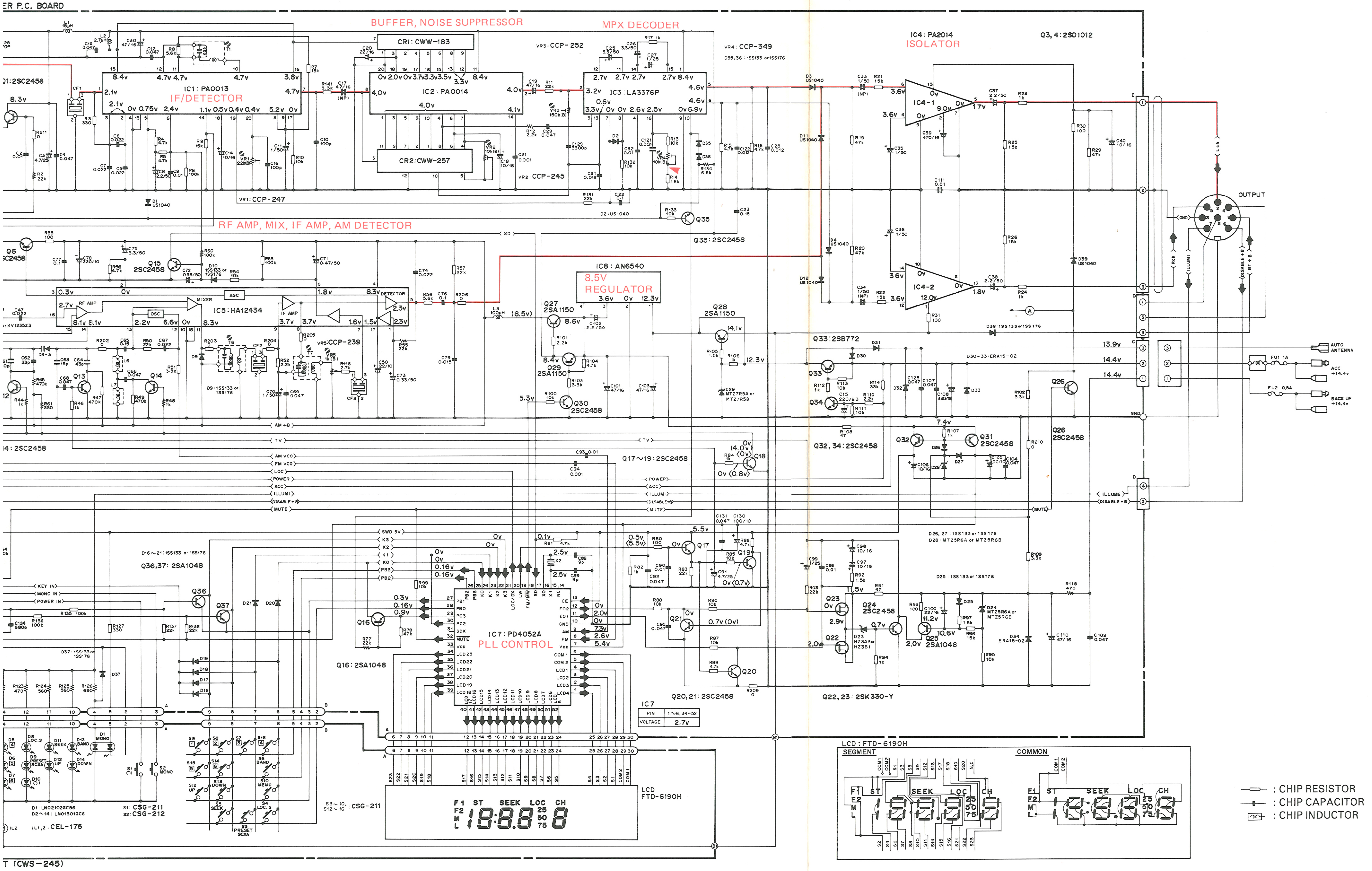
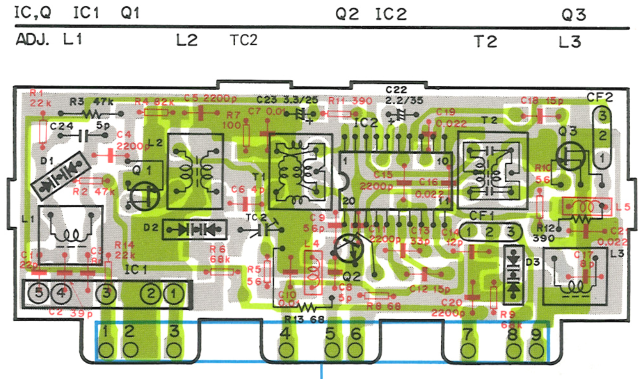

3
4
5
6
7
8
9
A
B
C
D
ER P.C. BOARD
BUFFER, NOISE SUPPRESSOR
MPX DECODER
IC4 : PA2014
ISOLATOR
Q3, 4 : 2SD1012
IC1 : PA0013
IF/DETECTOR
IC2 : PA0014
IC3 : LA3376P
CR1 : CWW-183
CR2 : CWW-257
VR1 : CCP-247
VR2 : CCP-245
VR3 : CCP-252
VR4 : CCP-349
D35, 36 : 1SS133 or 1SS176
IC4-1
IC4-2
OUTPUT
Lch
Rch
GND
ILLUMI
DISABLE+B
BT+B
RF AMP, MIX, IF AMP, AM DETECTOR
IC5 : HA12434
RF AMP
MIXER
OSC
AGC
IF AMP
DETECTOR
VR5 : CCP-239
D9 : 1SS133 or 1SS176
Q15 2SC2458
Q35 : 2SC2458
IC8 : AN6540
8.5V REGULATOR
Q27 2SA1150
Q28 2SA1150
Q29 2SA1150
Q30 2SC2458
D29 MTZ7R5A or MTZ7R5B
Q33 : 2SB772
D30~33 : ERA15-02
Q32, 34 : 2SC2458
Q31 2SC2458
Q26 2SC2458
ANTENNA
ACC +14.4v
BACK UP +14.4v
FU1 1A
FU2 0.5A
Q17~19 : 2SC2458
D16~21 : 1SS133 or 1SS176
Q36,37 : 2SA1048
Q16 : 2SA1048
D37 : 1SS133 or 1SS176
IC7 : PD4052A
PLL CONTROL
Q20, 21 : 2SC2458
Q22, 23 : 2SK330-Y
Q24 2SC2458
Q25 2SA1048
D23 HZ3A3 or HZ3B1
D24 MTZ5R6A or MTZ5R6B
D26, 27 : 1SS133 or 1SS176
D28 : MTZ5R6A or MTZ5R6B
D25 : 1SS133 or 1SS176
D34 ERA15-02
IC7
PIN 1~6, 34~52
VOLTAGE 2.7v
KEY IN
MONO IN
POWER IN
AM VCO
FM VCO
LOC
POWER
ACC
ILLUMI
DISABLE+B
MUTE
AM+B
TV
SD
D1 : LNO2102GC56
D2~14 : LNO1301GC6
S1 : CSG-211
S2 : CSG-212
IL1, 2 : CEL-175
S3~10, S12~16 : CSG-211
LCD FTD-6190H
LCD : FTD-6190H
SEGMENT
COMMON
F1 ST SEEK LOC CH
F2 M L
T (CWS-245)
: CHIP RESISTOR
: CHIP CAPACITOR
: CHIP INDUCTOR

Fig. 21

8. CONNECTION DIAGRAM (/EW)

FM FRONT END (CWB-172)



IC,Q IC1 Q1 Q2 IC2 Q3
ADJ. L1 L2 TC2 T2 L3
CF2
CF1
IC1
IC2
Q1
Q2
Q3
D1
D2
D3

IC1 : CWW-173
IC2 : PA4009-A
Q1 : P003
Q2 : 2SC2570
Q3 : 2SK241-GR
D1～3 : KV1310-6

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC1	2.1	2.1	2.1	0	0.75	2.4	4.7	5.2	5.2	4.7	4.7	4.7	0	1.1	8.4	3.6	0	0.5	0.4	0.4
IC2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	8.4	3.3	3.3	4.1	3.5	3.5	3.7	2.0	0	0
IC3	8.4	3.2	3.3	2.6	4.6	4.6	0	0	0	6.9	2.7	2.7	0.6	2.7	2.7	2.5				
IC4	12.0	9.0	╱	3.6	1.7	3.6	0	0	0	0	╱	3.6	1.8	3.6	0	╱				
IC5	2.3	0	0.3	8.3	2.3	1.8	1.6	3.7	3.7	0	8.3	6.6	2.2	8.1	8.1	2.7	1.5	0		
IC6	0.7	0	1.5	0	0	╱	0	╱	5.2	5.5	5.4	5.5	5.5	0.8	2.8	0	0	5.6	0	5.5

(V)

TUNER P.C. BOARD

	1～6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC7	2.7	5.4	2.6	7.3	0	2.0	0	5.5	╱	2.5	2.5	0.1	5.3	0.5 ⟨5.5⟩	╱
	21～24	25	26	27	28	29	30	31～33	34～52						
	0	0.16	0.16	0.3	0.16	0.9	0	╱	2.7						

(V)

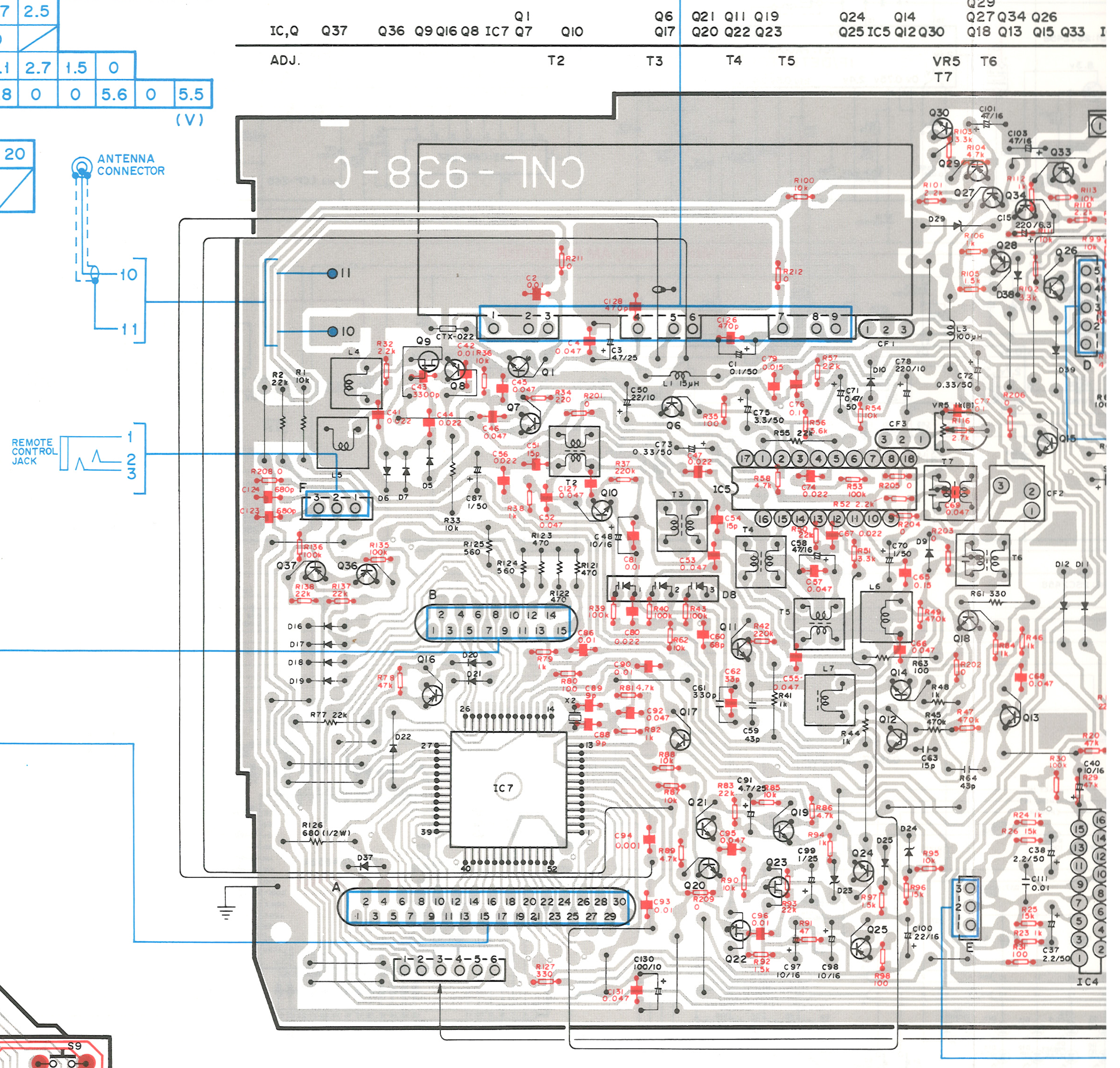
	Q1	Q16	Q18	Q19	Q21	Q24	Q25	Q27	Q28	Q29	Q31	Q32
E	╱	0.9	0	0	╱	0	11.2	8.6	12.3	8.6	╱	╱
C	8.3	0	0 (4.0) ⟨0⟩	0.7 (0)	0	2.0	2.0	8.5	14.1	8.4	7.4	7.4
B	╱	╱	0 ⟨0.8⟩	0 ⟨0.7⟩	0.7 (0)	0.7	10.6	╱	╱	╱	╱	╱

(V)

	Q22	Q23
D	2.9	2.9
S	11.5	11.5
G	2.0	0

(V)

TUNER P.C. BOARD



IC,Q Q37 Q36 Q9 Q16 Q8 IC7 Q1 Q7 Q10 Q6 Q17 Q21 Q20 Q11 Q22 Q19 Q23 Q24 Q25 Q14 IC5 Q12 Q30 Q29 Q27 Q18 Q34 Q13 Q26 Q15 Q33
ADJ. T2 T3 T4 T5 VR5 T7 T6
ANTENNA CONNECTOR
REMOTE CONTROL JACK
CNL-938-C
IC7
IC4
A
B

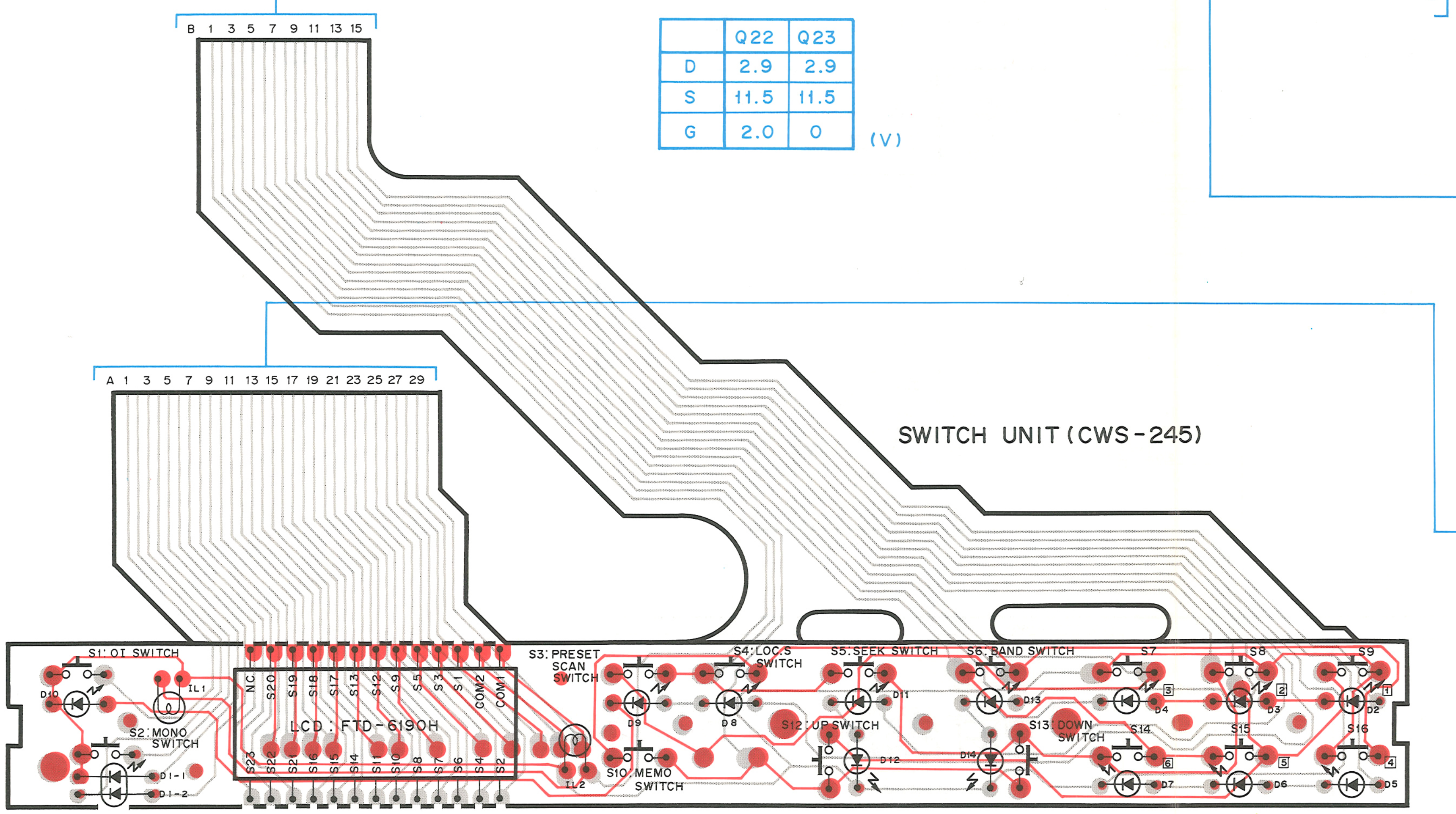
IC1 : PA0013
IC2 : PA0014
IC3 : LA3376P
IC4 : PA2014
IC5 : HA12434
IC6 : PD5030
IC7 : PD4052A
IC8 : AN6540

Q1, 2, 5～8, 10～15, 17～21, 24, 26, 30～32, 34, 35, 38, 39 : 2SC2458

Q9 : 2SK163
Q16, 25, 36, 37 : 2SA1048
Q22, 23 : 2SK330-Y
Q27～29 : 2SA1150
Q33 : 2SB772

D1～4, 11, 12, 39 : US1040
D5～7, 9, 10, 13～21, 25～27, 35
D8 : KV1235Z5 or KV1235Z3
D23 : HZ3A3 or HZ3B1
D24, 28 : MTZ5R6A or MTZ5R6B
D29, MTZ7R5A or MTZ7R5B
D30～34 : ERA 15-02

SWITCH UNIT (CWS-245)



B 1 3 5 7 9 11 13 15
A 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29
S1: OT SWITCH
S2: MONO SWITCH
S3: PRESET SCAN SWITCH
S4: LOC/S SWITCH
S5: SEEK SWITCH
S6: BAND SWITCH
S7
S8
S9
S10: MEMO SWITCH
S12: UP SWITCH
S13: DOWN SWITCH
S14
S15
S16
LCD : FTD-6190H
IL1
IL2

D1: LN02102GC56
D2～D14: LN01301GC6

8	9	10	11	12	13	14	15	16	17	18	19	20
5.2	5.2	4.7	4.7	4.7	0	1.1	8.4	3.6	0	0.5	0.4	0.4
4.0	4.0	4.0	8.4	3.3	3.3	4.1	3.5	3.5	3.7	2.0	0	0
0	0	6.9	2.7	2.7	0.6	2.7	2.7	2.5				
0	0	0		3.6	1.8	3.6	0					
3.7	3.7	0	8.3	6.6	2.2	8.1	8.1	2.7	1.5	0		
	5.2	5.5	5.4	5.5	5.5	0.8	2.8	0	0	5.6	0	5.5

(V)

TUNER P.C.BOARD

13	14	15	16	17	18	19	20
5.5		2.5	2.5	0.1	5.3	0.5 ⟨5.5⟩	

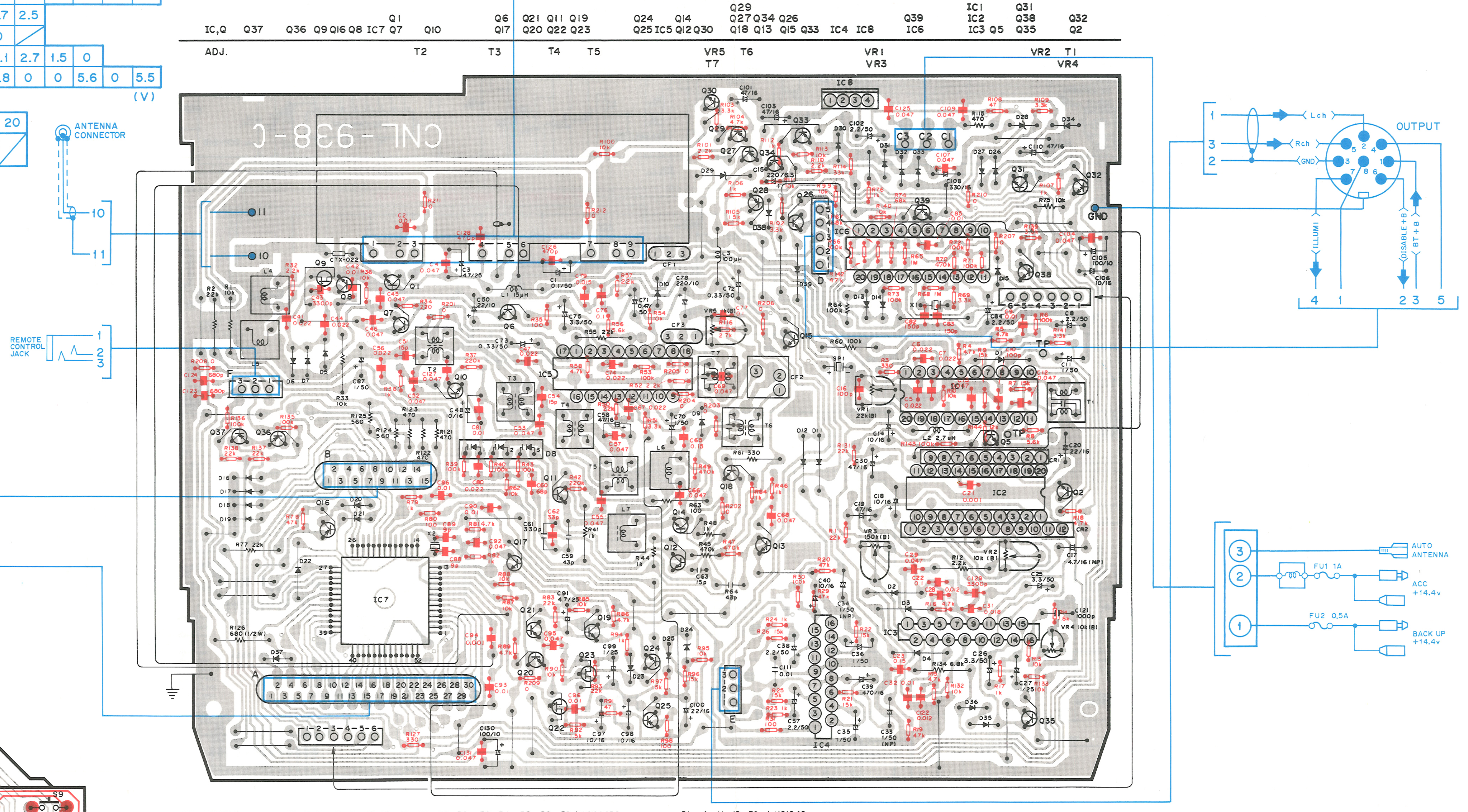
31~33	34~52
	2.7

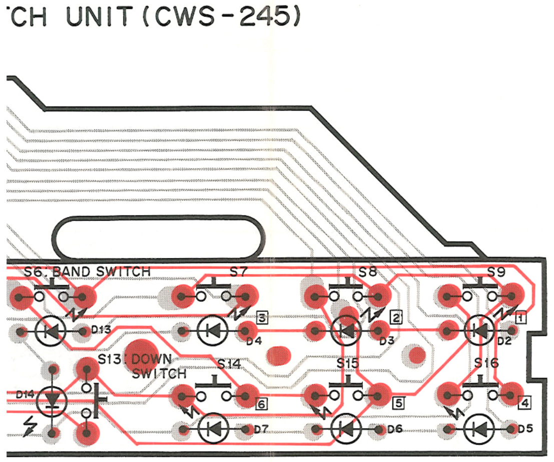
(V)

Q28	Q29	Q31	Q32
12.3	8.6		
14.1	8.4	7.4	7.4

(V)

TUNER P.C.BOARD


IC,Q Q37 Q36 Q9 Q16 Q8 IC7 Q7 Q1 Q10 Q6 Q17 Q21 Q11 Q19 Q20 Q22 Q23 Q24 Q14 Q25 IC5 Q12 Q30 Q29 Q27 Q34 Q26 Q18 Q13 Q15 Q33 IC4 IC8 Q39 IC6 IC1 IC2 IC3 Q5 Q31 Q38 Q35 Q32 Q2
ADJ. T2 T3 T4 T5 VR5 T7 T6 VR1 VR3 VR2 T1 VR4
CNL-938-C
ANTENNA CONNECTOR
REMOTE CONTROL JACK
OUTPUT
Lch
Rch
GND
ILLUMI
DISABLE+B
BT+B
AUTO ANTENNA
FU1 1A
ACC +14.4v
FU2 0.5A
BACK UP +14.4v
IC1 IC2 IC3 IC4 IC5 IC6 IC7 IC8
TP
A B C D E F


CH UNIT (CWS-245)
S6 : BAND SWITCH
S7
S8
S9
S13 : DOWN SWITCH
S14
S15
S16
D13
D4
D3
D2
D14
D7
D6
D5

IC1 : PA0013
IC2 : PA0014
IC3 : LA3376P
IC4 : PA2014
IC5 : HA12434
IC6 : PD5030
IC7 : PD4052A
IC8 : AN6540

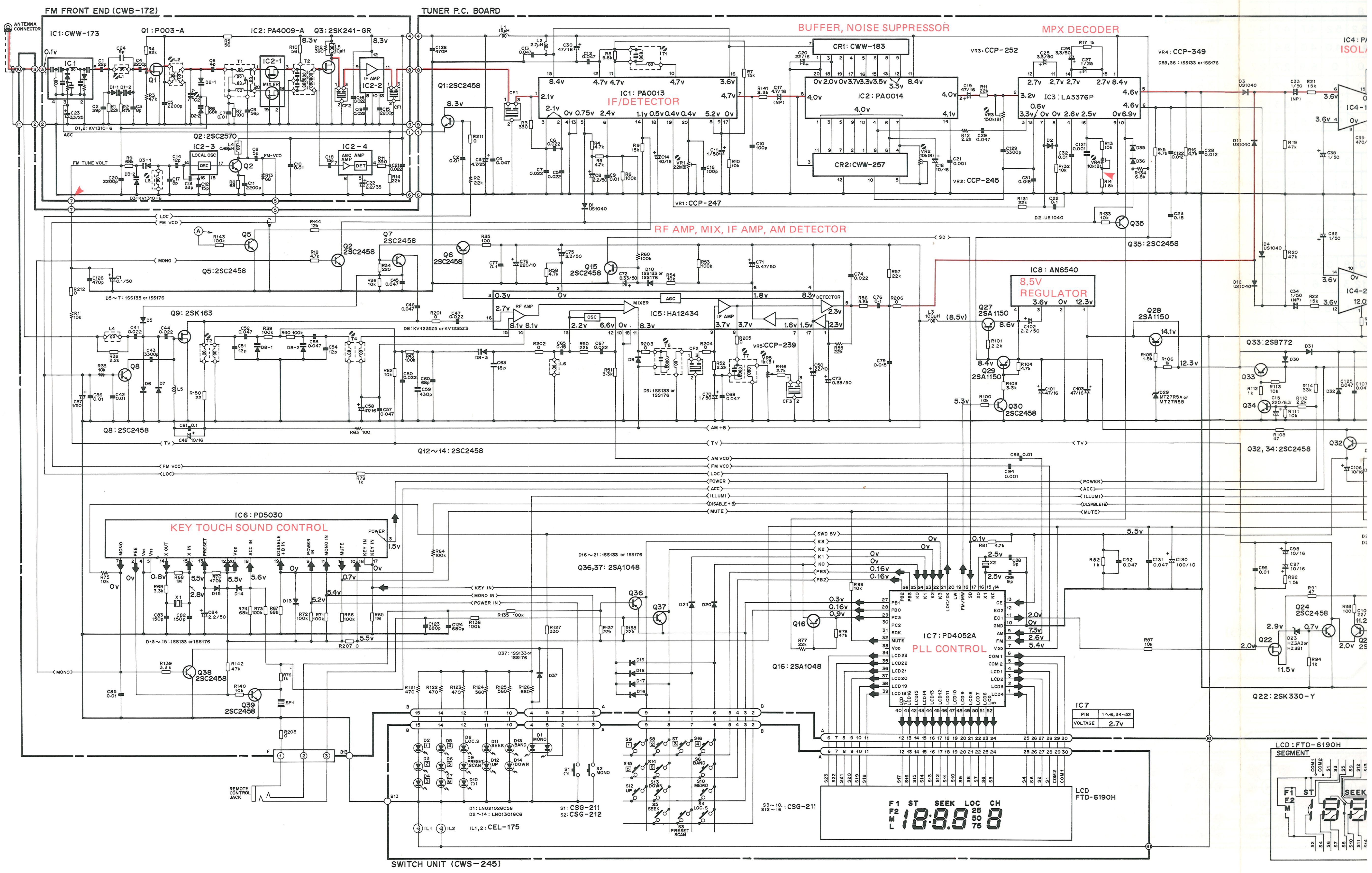
Q1, 2, 5～8, 10～15, 17～21, 24, 26, 30～32, 34, 35, 38, 39 : 2SC2458

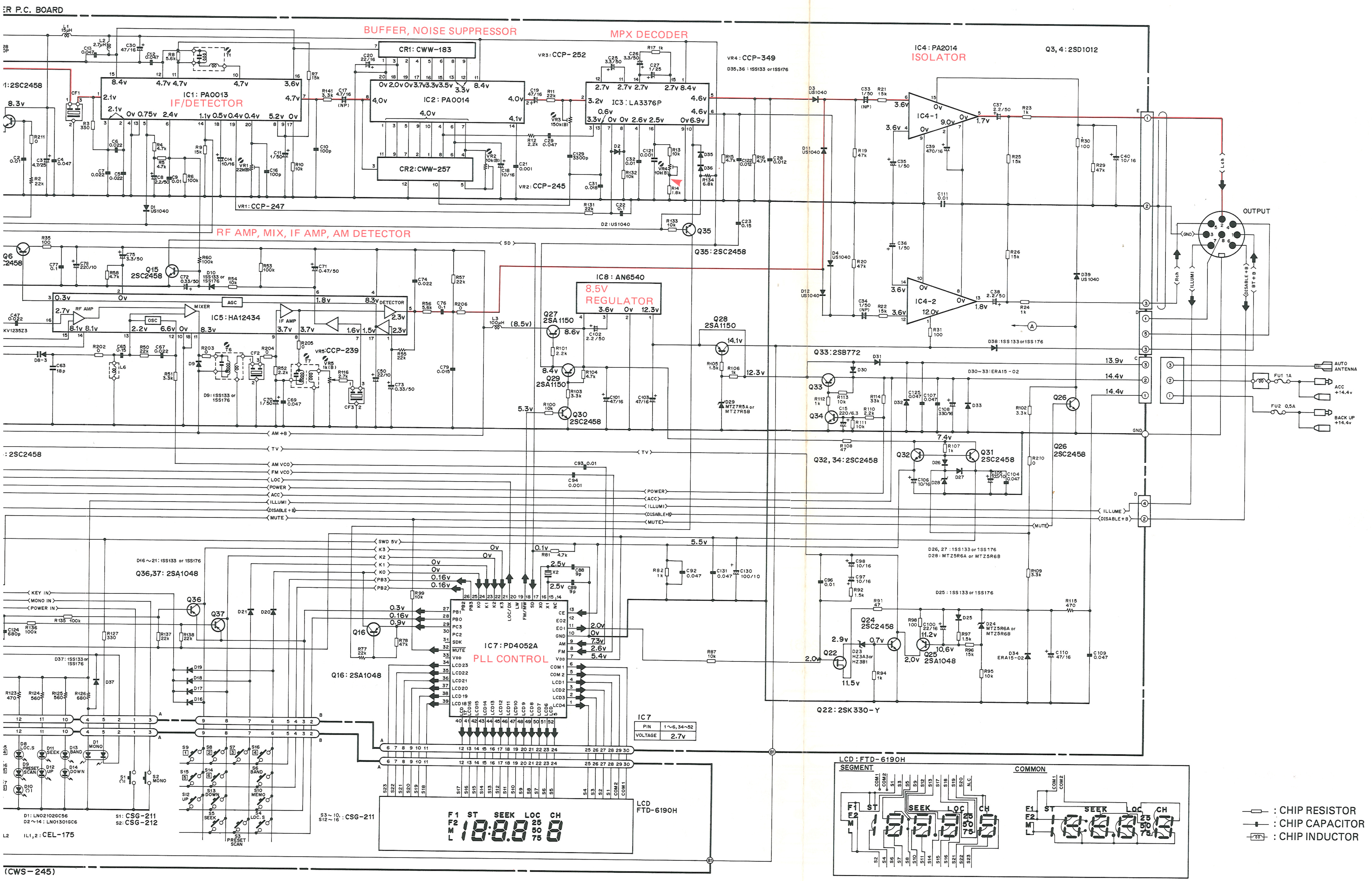
Q9 : 2SK163
Q16, 25, 36, 37 : 2SA1048
Q22, 23 : 2SK330－Y
Q27～29 : 2SA1150
Q33 : 2SB772

D1～4, 11, 12, 39 : US1040
D5～7, 9, 10, 13～21, 25～27, 35～38 : ISS133 or ISS176
D8 : KV1235Z5 or KV1235Z3
D23 : HZ3A3 or HZ3B1
D24, 28 : MTZ5R6A or MTZ5R6B
D29, MTZ7R5A or MTZ7R5B
D30～34 : ERA 15－02

Fig. 22

9. SCHEMATIC CIRCUIT DIAGRAM (/ES)


1
2
3
4
5
6
A
B
C
D
FM FRONT END (CWB-172)
TUNER P.C. BOARD
ANTENNA CONNECTOR
IC1: CWW-173
Q1: P003-A
IC2: PA4009-A
Q3: 2SK241-GR
Q2: 2SC2570
IC2-3 LOCAL OSC
IC2-4 AGC AMP DET
IF AMP
MIX ER
FM TUNE VOLT
D1,2: KV1310-6
D3: KV1310-6
Q1: 2SC2458
BUFFER, NOISE SUPPRESSOR
MPX DECODER
CR1: CWW-183
IC1: PA0013
IF/DETECTOR
IC2: PA0014
CR2: CWW-257
IC3: LA3376P
VR1: CCP-247
VR2: CCP-245
VR3: CCP-252
VR4: CCP-349
D35,36: 1SS133 or 1SS176
Q35: 2SC2458
IC4: P
ISOL
RF AMP, MIX, IF AMP, AM DETECTOR
IC5: HA12434
RF AMP
MIXER
OSC
AGC
IF AMP
DETECTOR
VR5: CCP-239
IC8: AN6540
8.5V REGULATOR
Q27 2SA1150
Q28 2SA1150
Q29 2SA1150
Q30 2SC2458
Q5: 2SC2458
Q6 2SC2458
Q7 2SC2458
Q8: 2SC2458
Q9: 2SK163
Q12~14: 2SC2458
Q15 2SC2458
D5~7: 1SS133 or 1SS176
D8: KV1235Z5 or KV1235Z3
D9: 1SS133 or 1SS176
Q33: 2SB772
Q32, 34: 2SC2458
IC6: PD5030
KEY TOUCH SOUND CONTROL
D43~15: 1SS133 or 1SS176
D16~21: 1SS133 or 1SS176
Q36,37: 2SA1048
Q38 2SC2458
Q39 2SC2458
Q16: 2SA1048
IC7: PD4052A
PLL CONTROL
IC7 PIN 1~6,34~52 VOLTAGE 2.7V
Q22: 2SK330-Y
Q24 2SC2458
LCD: FTD-6190H
SEGMENT
LCD FTD-6190H
F1 F2 M L ST SEEK LOC CH
REMOTE CONTROL JACK
SWITCH UNIT (CWS-245)
D1: LN02102GC56
D2~14: LN01301GC6
IL1,2: CEL-175
S1: CSG-211
S2: CSG-212
S3~10, S12~16: CSG-211
LOC
FM VCO
MONO
SD
AM +B
TV
AM VCO
POWER
ACC
ILLUMI
DISABLE +B
MUTE
SWD 5V
KEY IN
MONO IN
POWER IN

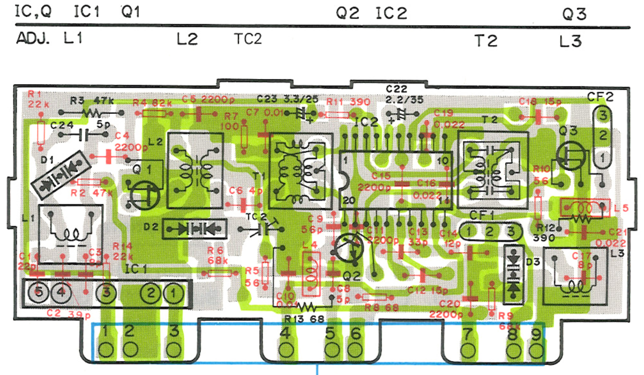

ER P.C. BOARD
BUFFER, NOISE SUPPRESSOR
CR1: CWW-183
CR2: CWW-257
IC1: PA0013
IF/DETECTOR
IC2: PA0014
MPX DECODER
IC3: LA3376P
VR1: CCP-247
VR2: CCP-245
VR3: CCP-252
VR4: CCP-349
D35,36: 1SS133 or 1SS176
IC4: PA2014
ISOLATOR
IC4-1
IC4-2
Q3,4: 2SD1012
OUTPUT
Lch
Rch
ILLUMI
DISABLE+B
BT+B
RF AMP, MIX, IF AMP, AM DETECTOR
IC5: HA12434
MIXER
AGC
OSC
IF AMP
DETECTOR
RF AMP
VR5: CCP-239
Q15 2SC2458
D10 1SS133 or 1SS176
D9: 1SS133 or 1SS176
IC8: AN6540
8.5V REGULATOR
Q27 2SA1150
Q28 2SA1150
Q29 2SA1150
Q30 2SC2458
Q35: 2SC2458
D29 MTZ7R5A or MTZ7R5B
Q33: 2SB772
Q32, 34: 2SC2458
Q31 2SC2458
Q26 2SC2458
D30~33: ERA15-02
D38: 1SS133 or 1SS176
AUTO ANTENNA
ACC +14.4V
BACK UP +14.4V
FU1 1A
FU2 0.5A
13.9v
14.4v
GND
AM+B
TV
AM VCO
FM VCO
LOC
POWER
ACC
ILLUMI
DISABLE+B
MUTE
SWD 5V
KEY IN
MONO IN
POWER IN
D16~21: 1SS133 or 1SS176
Q36,37: 2SA1048
D37: 1SS133 or 1SS176
Q16: 2SA1048
IC7: PD4052A
PLL CONTROL
D26, 27: 1SS133 or 1SS176
D28: MTZ5R6A or MTZ5R6B
D25: 1SS133 or 1SS176
Q24 2SC2458
Q25 2SA1048
Q22
Q22: 2SK330-Y
D23 HZ3A3or HZ3B1
D24 MTZ5R6A or MTZ5R6B
D34 ERA15-02
IC7
PIN 1~6, 34~52
VOLTAGE 2.7v
LCD: FTD-6190H
SEGMENT
COMMON
F1 ST SEEK LOC CH
F2
M
L
25
50
75
D1: LN0210GC56
D2~14: LN01301GC6
IL1,2: CEL-175
S1: CSG-211
S2: CSG-212
S3~10: CSG-211
S12~16
S1 MONO
S2 MONO
S3 PRESET SCAN
S4 LOC.S
S5 SEEK
S6 BAND
S10 MEMO
S12 UP
S13 DOWN
(CWS-245)

- ▭ : CHIP RESISTOR
- ⊣⊢ : CHIP CAPACITOR
- ▨ : CHIP INDUCTOR

Fig. 23

10. CONNECTION DIAGRAM (/ES)

FM FRONT END (CWB-172)



IC,Q ADJ.
IC1 L1
Q1
L2
TC2
Q2 IC2
T2
Q3 L3
IC1
IC2
Q1
Q2
Q3
CF1
CF2

IC1 : CWW-173
IC2 : PA4009-A

Q1 : P003
Q2 : 2SC2570
Q3 : 2SK241-GR

D1～3 : KV1310-6

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC1	2.1	2.1	2.1	0	0.75	2.4	4.7	5.2	5.2	4.7	4.7	4.7	0	1.1	8.4	3.6	0	0.5	0.4	0.4
IC2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	8.4	3.3	3.3	4.1	3.5	3.5	3.7	2.0	0	0
IC3	8.4	3.2	3.3	2.6	4.6	4.6	0	0	0	6.9	2.7	2.7	0.6	2.7	2.7	2.5				
IC4	12.0	9.0	／	3.6	1.7	3.6	0	0	0	0	／	3.6	1.8	3.6	0	／				
IC5	2.3	0	0.3	8.3	2.3	1.8	1.6	3.7	3.7	0	8.3	6.6	2.2	8.1	8.1	2.7	1.5	0		
IC6	0.7	0	1.5	0	0	／	0	／	5.2	5.5	5.4	5.5	5.5	0.8	2.8	0	0	5.6	0	5.5

(V)

	1～6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC7	2.7	5.4	2.6	7.3	0	2.0	0	5.5	／	2.5	2.5	0.1	5.3	0.5 ⟨5.5⟩	／
	21～24	25	26	27	28	29	30	31～33	34～52						
	0	0.16	0.16	0.3	0.16	0.9	0	／	2.7						

(V)

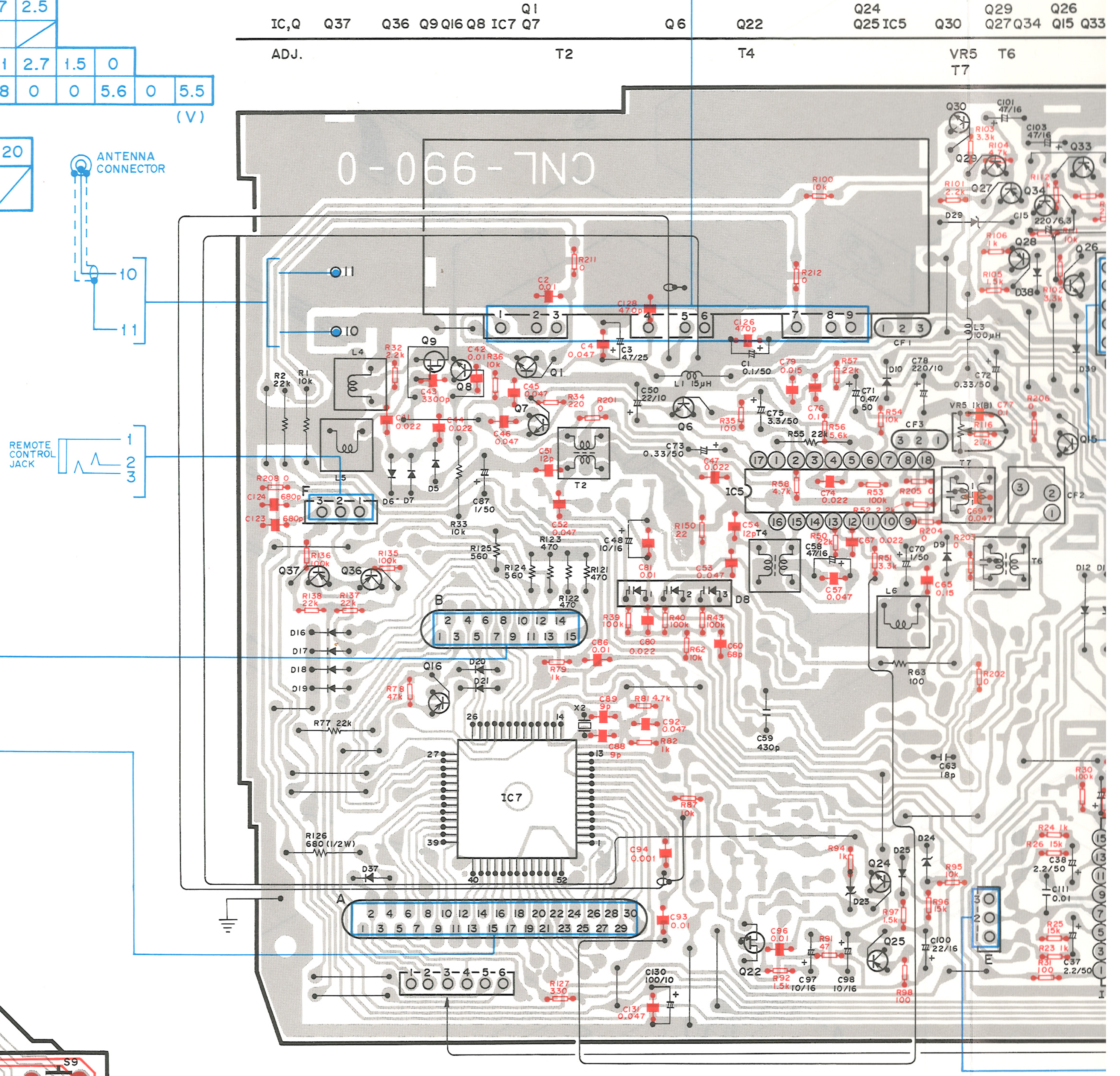
	Q1	Q16	Q24	Q25	Q27	Q28	Q29	Q31	Q32
E	／	0.9	0	11.2	8.6	12.3	8.6	／	／
C	8.3	0	2.0	2.0	8.5	14.1	8.4	7.4	7.4
B	／	／	0.7	10.6	／	／	／	／	／

(V)

	Q22
D	2.9
S	11.5
G	2.0

(V)

TUNER P.C.BOARD



TUNER P.C.BOARD
IC,Q ADJ.
Q37
Q36 Q9 Q16 Q8 IC7 Q1 Q7
T2
Q6
Q22 T4
Q24 Q25 IC5
Q30
VR5 T7
Q29 Q27 Q34
T6
Q15 Q33
ANTENNA CONNECTOR
REMOTE CONTROL JACK
CNL-066-0
IC5
IC7
T2
CF1
CF2
CF3

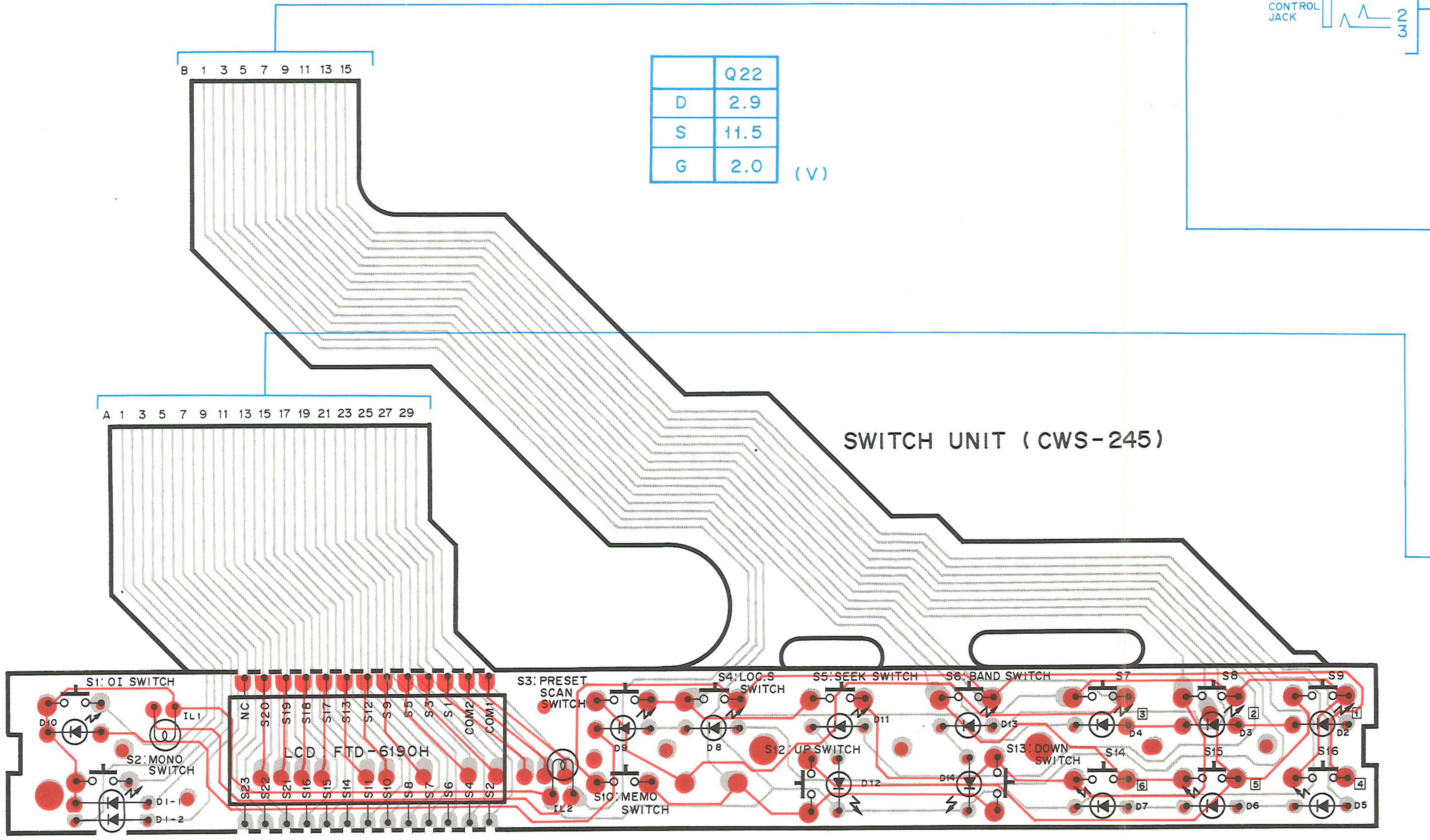
IC1 : PA0013
IC2 : PA0014
IC3 : LA3376P
IC4 : PA2014
IC5 : HA12434
IC6 : PD5030
IC7 : PD4052A
IC8 : AN6540

Q1, 2, 5～8, 15, 24, 26, 30～32, 34, 35, 38, 39 : 2SC2458

Q9 : 2SK163
Q16, 25, 36, 37 : 2SA1048
Q22 : 2SK330-Y
Q27～29 : 2SA1150
Q33 : 2SB772

D1～4, 11, 12, 39 : US1040
D5～7, 9, 10, 13～21, 25～27
D8 : KV1235Z5 or KV1235Z3
D23 : HZ3A3 or HZ3B1
D24, 28 : MTZ5R6A or MTZ5R6
D29, MTZ7R5A or MTZ7R5B
D30～34 : ERA 15-02

SWITCH UNIT (CWS-245)



B 1 3 5 7 9 11 13 15
A 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29
S1: OI SWITCH
S2: MONO SWITCH
LCD FTD-6190H
S3: PRESET SCAN SWITCH
S4: LOC.S SWITCH
S5: SEEK SWITCH
S6: BAND SWITCH
S7
S8
S9
S10: MEMO SWITCH
S12: UP SWITCH
S13: DOWN SWITCH
S14
S15
S16

D1 : LN02102GC56
D2～D14 : LN01301GC6

	8	9	10	11	12	13	14	15	16	17	18	19	20
7	5.2	5.2	4.7	4.7	4.7	0	1.1	8.4	3.6	0	0.5	0.4	0.4
.0	4.0	4.0	4.0	8.4	3.3	3.3	4.1	3.5	3.5	3.7	2.0	0	0
	0	0	6.9	2.7	2.7	0.6	2.7	2.7	2.5				
	0	0	0		3.6	1.8	3.6	0					
6	3.7	3.7	0	8.3	6.6	2.2	8.1	8.1	2.7	1.5	0		
		5.2	5.5	5.4	5.5	5.5	0.8	2.8	0	0	5.6	0	5.5

(V)

12	13	14	15	16	17	18	19	20
0	5.5		2.5	2.5	0.1	5.3	0.5 〈5.5〉	

30	31~33	34~52
0		2.7

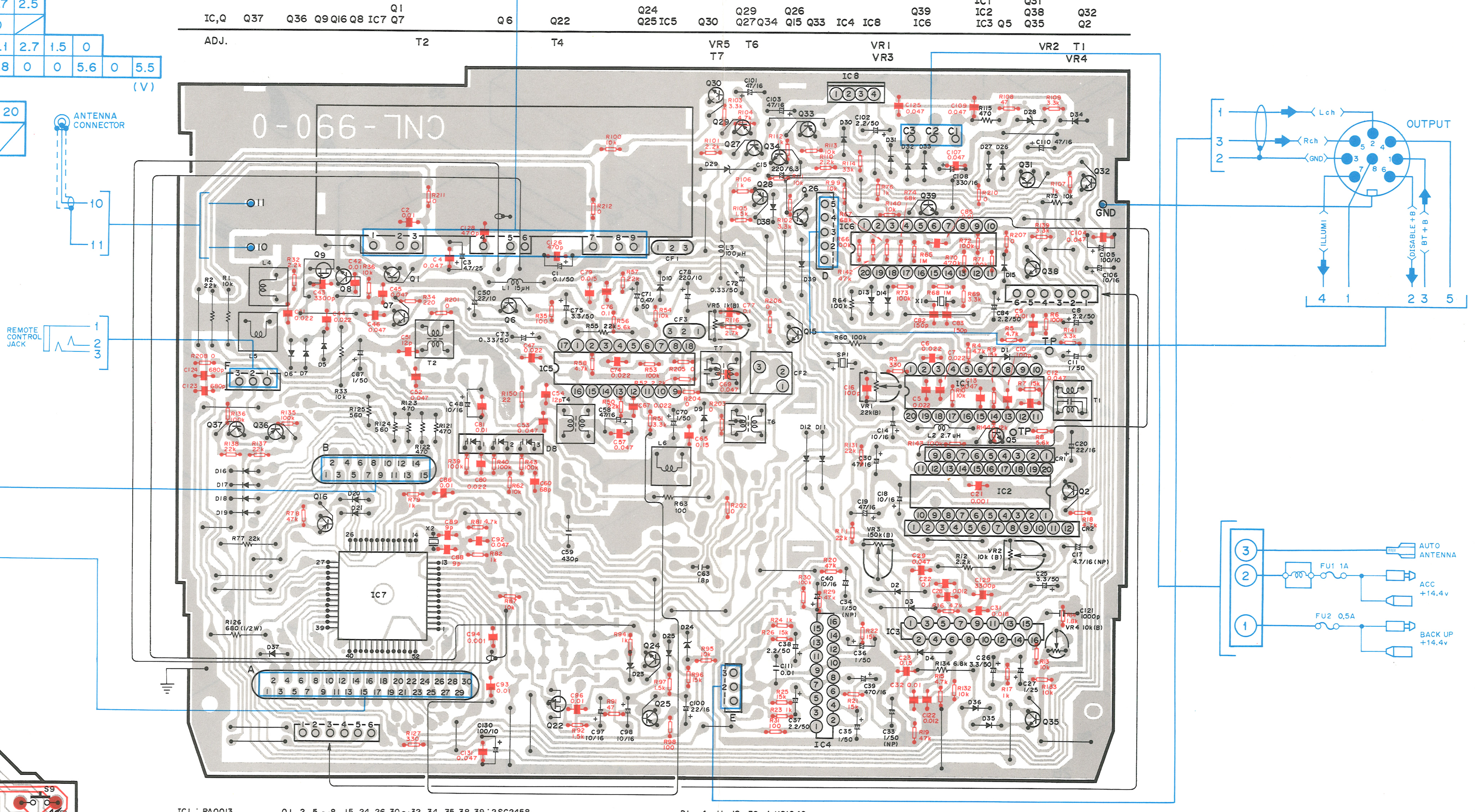
(V)

	Q28	Q29	Q31	Q32
6	12.3	8.6		
5	14.1	8.4	7.4	7.4

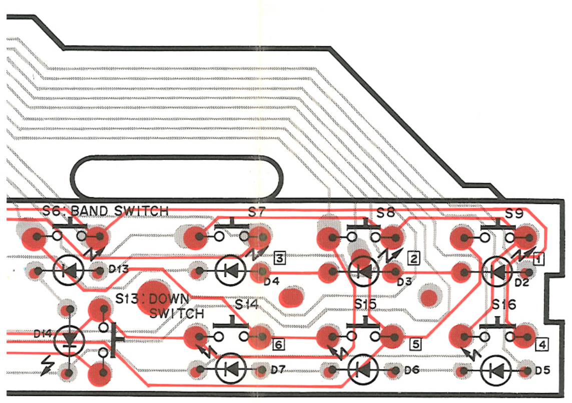
(V)

TUNER P.C.BOARD

TUNER P.C.BOARD


IC,Q Q37 Q36 Q9 Q16 Q8 IC7 Q1 Q7 Q6 Q22 Q24 Q25 IC5 Q30 Q29 Q27 Q34 Q26 Q15 Q33 IC4 IC8 Q39 IC6 IC1 IC2 IC3 Q5 Q31 Q38 Q35 Q32 Q2
ADJ. T2 T4 VR5 T7 T6 VR1 VR3 VR2 T1 VR4
ANTENNA CONNECTOR
REMOTE CONTROL JACK
CNL-066-0
OUTPUT
Lch
Rch
GND
ILLUMI
DISABLE +B
BT+B
AUTO ANTENNA
ACC +14.4V
BACK UP +14.4V
FU1 1A
FU2 0.5A
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
TP
A
B
C
D

H UNIT (CWS-245)


S6: BAND SWITCH
S7
S8
S9
S13: DOWN SWITCH
S14
S15
S16

IC1 : PA0013
IC2 : PA0014
IC3 : LA3376P
IC4 : PA2014
IC5 : HA12434
IC6 : PD5030
IC7 : PD4052A
IC8 : AN6540

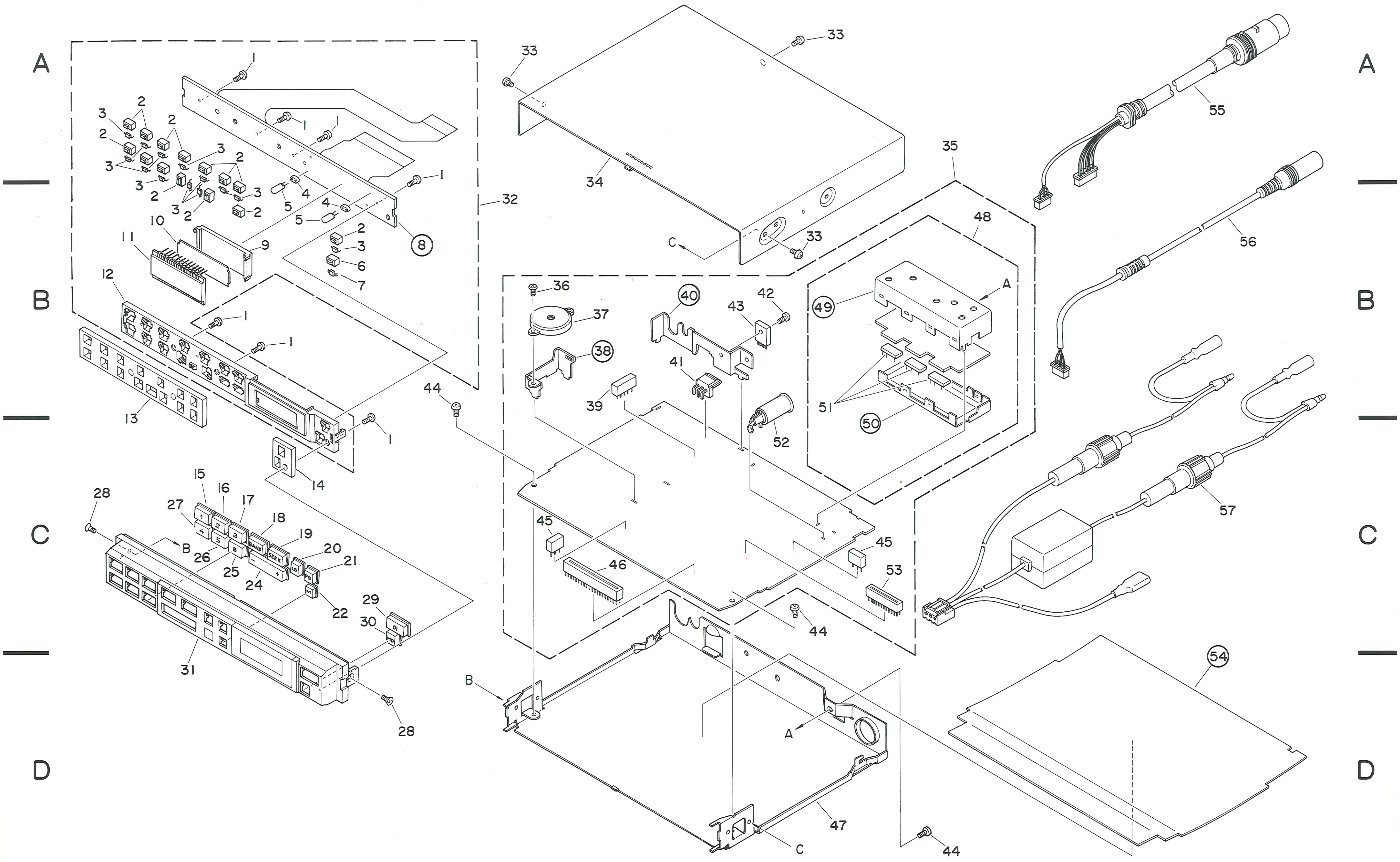
Q1, 2, 5~8, 15, 24, 26, 30~32, 34, 35, 38, 39 : 2SC2458

Q9 : 2SK163
Q16, 25, 36, 37 : 2SA1048
Q22 : 2SK330-Y
Q27~29 : 2SA1150
Q33 : 2SB772

D1~4, 11, 12, 39 : US1040
D5~7, 9, 10, 13~21, 25~27, 35~38 : ISS133 or ISS176
D8 : KV1235Z5 or KV1235Z3
D23 : HZ3A3 or HZ3B1
D24, 28 : MTZ5R6A or MTZ5R6B
D29, MTZ7R5A or MTZ7R5B
D30~34 : ERA 15-02

Fig. 24

11. EXPLODED VIEW


1
2
3
4
5
6
A
B
C
D
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
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24
25
26
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28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
A
B
C
BAND
SEEK
LS
PS

Fig. 25

NOTE:

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
  ★ ★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

• Parts List

Mark	No.	Part No.	Description
	1.	PVZ14P045FZK	Screw
★★	2.	CSG-211	Switch
★	3.	LN01301GC6	LED
	4.	CNW-549	Spacer
★★	5.	CEL-175	Lamp
★★	6.	CSG-212	Switch (MONO)
★	7.	LN02102GC56	LED (MONO)
	8.		P.C. Board
	9.	CNY-172	Lens
	10.	CNN-504	Sheet
	11.	FTD-6190H	LCD
	12.	CNY-161	Holder
	13.	CNN-505	Cushion
	14.	CNN-512	Cushion
★	15.	CAE-257	Button (1) (GEX-007 (MB))
		CAC-773	Button (1) (GEX-007)
★	16.	CAE-258	Button (2) (GEX-007 (MB))
		CAC-774	Button (2) (GEX-007)
★	17.	CAE-259	Button (3) (GEX-007 (MB))
		CAC-775	Button (3) (GEX-007)
★	18.	CAE-255	Button (BAND) (GEX-007 (MB))
		CAC-591	Button (BAND) (GEX-007)
★	19.	CAE-254	Button (SEEK) (GEX-007 (MB))
		CAE-101	Button (SEEK) (GEX-007)
★	20.	CAE-253	Button (LS) (GEX-007 (MB))
		CAC-584	Button (LS) (GEX-007)
★	21.	CAE-252	Button (PS) (GEX-007 (MB))
		CAE-102	Button (PS) (GEX-007)
★	22.	CAE-105	Button (M)
	23.	VACANT	
★	24.	CAE-256	Button (−+) (GEX-007 (MB))
		CAC-566	Button (−+) (GEX-007)
★	25.	CAE-262	Button (6) (GEX-007 (MB))
		CAE-168	Button (6) (GEX-007)
★	26.	CAE-261	Button (5) (GEX-007 (MB))
		CAC-777	Button (5) (GEX-007)
★	27.	CAE-260	Button (4) (GEX-007 (MB))
		CAC-776	Button (4) (GEX-007)
	28.	CMZ26P040FMC	Screw
★	29.	CAE-250	Button (OI) (GEX-007 (MB))
		CAC-674	Button (OI) (GEX-007)
★	30.	CAE-251	Button (MO) (GEX-007 (MB))
		CAE-103	Button (MO) (GEX-007)
	31.	CXD-882	Grille Assy (GEX-007 (MB))
		CXD-762	Grille Assy (GEX-007)
	32.	CWS-245	Switch Unit
	33.	BMZ26P050FZK	Screw (GEX-007 (MB))
		CBA-142	Screw (GEX-007)
	34.	CNB-969	Case (GEX-007 (MB))
		CNB-937	Case (GEX-007)
	35.	CWE-697	Tuner Unit (/EW)
		CWE-698	Tuner Unit (/ES)
	36.	BMZ20P040FMC	Screw
	37.	CPV-031	Buzzer
	38.		Holder
	39.	CKS-569	Plug (5P)
	40.		Holder
	41.	CKS-460	Connector
	42.	BMZ26P060FMC	Screw
★★	43.	AN6540	IC
	44.	BMZ26P050FMC	Screw
	45.	CKS-567	Plug (3P)
	46.	CKS-416	Connector (30P)
	47.	CNA-310	Chassis
	48.	CWB-172	FM Front End
	49.		Case
	50.		Case
	51.	CKS-601	Plug
	52.	CKX-006	Antenna Connector
	53.	CKS-401	Connector (15P)
	54.		Insulator
	55.	CDK-112	DIN Connector Cord
	56.	CDK-368	Cord
	57.	CDK-308	Cord

12. ELECTRICAL PARTS LIST

NOTE:

When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω 56×10^1 561 .... RD1/4PS$\boxed{5}\boxed{6}\boxed{1}$*J*
47kΩ 47×10^3 473 .... RD1/4PS$\boxed{4}\boxed{7}\boxed{3}$*J*
0.5Ω 0R5 .... RN2H$\boxed{0}\boxed{R}\boxed{5}$*K*
1Ω 010 .... RS1P$\boxed{0}\boxed{1}\boxed{0}$*K*

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62kΩ 562×10^1 .... RN1/4SR$\boxed{5}\boxed{6}\boxed{2}\boxed{1}$*F*

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*
  Chip Resistor
  RS1/8S □□□J
  Chip Capacitor (except for CQS.....)
  CKS....., CCS.....

Tuner P.C. Board (/EW)

MISCELLANEOUS

Mark	Symbol & Description		Part No.
★★	IC1		PA0013
★★	IC2		PA0014
★★	IC3		LA3376P
★★	IC4		PA2014
★★	IC5		HA12434
★★	IC6		PD5030
★★	IC7		PD4052A
★★	IC8		AN6540
★★	Q1, 2, 5 – 8, 10 – 15, 17 – 21, 24, 26, 30 – 32, 34, 35, 38, 39		2SC2458
★★	Q9		2SK163
★★	Q16, 25, 36, 37		2SA1048
★★	Q22, 23		2SK330
★★	Q27 – 29		2SA1150
★★	Q33		2SB772
★	D1 – 4, 11, 12, 39		US1040
★	D5 – 7, 9, 10, 13 – 21, 25 – 27, 35 – 38		1SS133 or 1SS176
★	D8		KV1235Z5 or KV1235Z3
★	D23		HZ3A3 or HZ3B1
★	D24, 28		MTZ5R6A or MTZ5R6B
★	D29		MTZ7R5A or MTZ7R5B
★	D30 – 34		ERA15-02
	L1	Ferri-Inductor	CTF-156
	L2	Ferri-Inductor	CTF-155
	L3	Ferri-Inductor	CTF-157
	L4	Coil	CTB-149
	L5	Coil	CTB-167
	L6	Coil	CTB-164
	L7	Coil	CTB-165
	T1	Coil	CTC-198
	T2, 4	Coil	CTB-150
	T3, 5	Coil	CTB-151
	T6	Coil	CTE-139
	T7	Coil	CTE-140
	CF1	Ceramic Filter	CTF-182
	CF2	Filter	CTF-100
	CF3	Filter	CTF-165
	CR1		CWW-183
	CR2		CWW-257
★★	VR1	Semi-fixed, 22 kΩ (B)	CCP-247
★★	VR2	Semi-fixed, 10 kΩ (B)	CCP-245
★★	VR3	Semi-fixed, 150 kΩ (B)	CCP-252
★★	VR4	Semi-fixed, 10 kΩ (B)	CCP-349
★★	VR5	Semi-fixed, 1 kΩ (B)	CCP-239
	X1		CSS-052
	X2	X'tal	CSS-046
	SP1	Buzzer	CPV-031
		Bead Core	CTX-022

RESISTORS

Mark	Symbol & Description	Part No.
	R1, 2, 12, 33, 41, 55, 60, 61, 63, 134	RD1/4PM□□□J
	R44, 45, 48, 64, 75, 115, 121 – 125	RD1/4PS□□□JL
	R126	RD1/2PS□□□JL
	Other Resistors	RS1/8S□□□J

CAPACITORS

Mark	Symbol & Description	Part No.
	C1	CEA0R1M50L2
	C2, 9, 32, 42, 85, 86, 90, 93, 96	CKSYB103K50
	C3, 91	CEA4R7M25L2
	C4, 12, 13, 29, 45, 46, 52, 53, 55, 57, 66, 68, 69, 92, 95, 104, 107, 109, 125, 127, 131	CKSYF473Z50
	C5 — 7, 41, 44, 47, 56, 67, 74, 80	CKSYB223K50
	C8, 37, 38, 84, 102	CEA2R2M50L2
	C10, 16	CCSSL101J50
	C11, 35, 36, 70, 87	CEA010M50L2
	C14, 18, 40, 106	CEA100M16L2
	C15	CEA221M6R3L2
	C17	CEA4R7M16NPLL
	C19, 30, 58, 101, 103, 110	CEA470M16L2
	C20, 50, 100	CEA220M16L2
	C21, 94	CKSYB102K50
	C22, 76, 77, 81	CKSYF104Z25
	C23, 65	CKSYF154Z25
	C25, 75	CEA3R3M50L2
	C26	CSZA3R3M25
	C27, 99	CSZA010K25
	C28, 122	CKSYB123K50
	C31	CKSYB183K25
	C33, 34	CEA010M50NPLL
	C39	CEA471M16L2
	C43, 129	CKSYB332K50
	C48, 97, 98	CSZA100M16
	C51, 54	CCSSH150J50
	C59	CCDRH430J50
	C60	CCSCH680J50
	C61	CQPA331G100
	C62	CCSCH330J50
	C63	CCDVK150J50L
	C64	CCDSH430J50
	C71	CEAR47M50L2
	C72, 73	CEAR33M50L2
	C78	CEA221M10L2
	C79	CKSYB153K50
	C82, 83	CCSSL151J50
	C88, 89	CCSCH090D50
	C105, 130	CEA101M10L2
	C108	CEA331M16L2
	C111	CQMA103J50L
	C121	CQPA102J100
	C123, 124	CKSYB681K50
	C126, 128	CCSSL471J50

Tuner P.C. Board (/ES)

MISCELLANEOUS

Mark	Symbol & Description		Part No.
★★	IC1		PA0013
★★	IC2		PA0014
★★	IC3		LA3376P
★★	IC4		PA2014
★★	IC5		HA12434
★★	IC6		PD5030
★★	IC7		PD4052A
★★	IC8		AN6540
★★	Q1, 2, 5 — 8, 15, 24, 26, 30 — 32, 34, 35, 38, 39		2SC2458
★★	Q9		2SK163
★★	Q16, 25, 36, 37		2SA1048
★★	Q22		2SK330
★★	Q27 — 29		2SA1150
★★	Q33		2SB772
★	D1 — 4, 11, 12, 39		US1040
★	D5 — 7, 9, 10, 13 — 21, 25 — 27, 35 — 38		1SS133 or 1SS176
★	D8		KV1235Z5 or KV1235Z3
★	D23		HZ3A3 or HZ3B1
★	D24, 28		MTZ5R6A or MTZ5R6B
★	D29		MTZ7R5A or MTZ7R5B
★	D30 — 34		ERA15-02
	L1	Ferri-Inductor	CTF-156
	L2	Ferri-Inductor	CTF-155
	L3	Ferri-Inductor	CTF-157
	L4	Coil	CTB-149
	L5	Coil	CTB-167
	L6	Coil	CTB-164
	T1	Coil	CTC-198
	T2, 4	Coil	CTB-150
	T6	Coil	CTE-139
	T7	Coil	CTE-140
	CF1	Ceramic Filter	CTF-182
	CF2	Filter	CTF-100
	CF3	Filter	CTF-165
	CR1		CWW-183
	CR2		CWW-257
	SP1	Buzzer	CPV-031
★★	VR1	Semi-fixed, 22 kΩ (B)	CCP-247
★★	VR2	Semi-fixed, 10 kΩ (B)	CCP-245
★★	VR3	Semi-fixed, 150 kΩ (B)	CCP-252
★★	VR4	Semi-fixed, 10 kΩ (B)	CCP-349
★★	VR5	Semi-fixed, 1 kΩ (B)	CCP-239
	X1		CSS-052
	X2	X'tal	CSS-046

RESISTORS

Mark	Symbol & Description	Part No.
	R1, 2, 12, 33, 55, 60, 63, 77, 134	RD1/4PM□□□J
	R64, 75, 115, 121 — 125	RD1/4PS□□□JL
	R126	RD1/2PS□□□JL
	Other Resistors	RS1/8S□□□J

CAPACITORS

Mark	Symbol & Description	Part No.
	C1	CEA0R1M50L2
	C2, 9, 32, 42, 85, 86, 93, 96	CKSYB103K50
	C3	CEA4R7M25L2
	C4, 12, 13, 29, 45, 46, 52, 53, 57, 69, 92, 104, 107, 109, 125, 131	CKSYF473Z50
	C5 — 7, 41, 44, 47, 67, 74	CKSYB223K50
	C8, 37, 38, 84, 102	CEA2R2M50L2
	C10, 16	CCSSL101J50
	C11, 35, 36, 70, 87	CEA010M50L2
	C14, 18, 40, 106	CEA100M16L2
	C15	CEA221M6R3L2
	C17	CEA4R7M16NPLL
	C19, 30, 58, 101, 103, 110	CEA470M16L2
	C20, 50, 100	CEA220M16L2
	C21, 94	CKSYB102K50
	C22, 76, 77, 81	CKSYF104Z25
	C23, 65	CKSYF154Z25
	C25, 75	CEA3R3M50L2
	C26	CSZA3R3M25
	C27	CSZA010K25
	C28, 122	CKSYB123K50
	C31	CKSYB183K25
	C33, 34	CEA010M50NPLL
	C39	CEA471M16L2
	C43, 129	CKSYB332K50
	C48, 97, 98	CSZA100M16
	C51, 54	CCSSH120J50
	C59	CQPA431G100
	C60	CCSCH680J50
	C63	CCDVK180J50L
	C71	CEAR47M50L2
	C72, 73	CEAR33M50L2
	C78	CEA221M10L2
	C79	CKSYB153K50
	C80	CKSYB223K50
	C82, 83	CCSSL151J50
	C88, 89	CCSCH090D50
	C105, 130	CEA101M10L2
	C108	CEA331M16L2
	C111	CQMA103J50L
	C121	CQPA102J100
	C123, 124	CKSYB681K50
	C126, 128	CCSSL471J50

FM Front End (CWB-172)

MISCELLANEOUS

Mark	Symbol & Description		Part No.
★★	IC1		CWW-173
★★	IC2		PA4009-A
★★	Q1		P003
★★	Q2		2SC2753 or 2SC2570
★★	Q3		2SK241
★	*D1		KV1310A-3 or
★	D1 — 3		KV1310-6
	L1	Coil	CTC-189
	L2	Coil	CTC-190
	L3	Coil	CTC-191
	L4	Chip Inductor	CTF-185
	L5	Chip Inductor	CTF-186
	T1	Transformer	CTC-186
	T2	IF Transformer	CTC-187
	CF1, 2	Ceramic Filter	CTF-182
	TC2	Trimmer	CCG-098

*KV1310A-3 consists of 3 parts. Separate it into 3 parts before installation. (Be sure to replace 3 parts at a time.)

RESISTORS

Mark	Symbol & Description	Part No.
	R1, 2, 4 — 11, 14	RS1/8S□□□J
	R3, 12, 13	RD1/6PS□□□J

CAPACITORS

Mark	Symbol & Description	Part No.
	C1	CCSSH220J50
	C2	CCSSH390J50
	C3	CCSCH080D50
	C4, 5, 11, 15, 20	CKSYB222K50
	C6	CCSCH040C50
	C7, 10	CKSYB103K50
	C8	CCSCH050C50
	C9	CCSSH560J50
	C12, 18	CCSTH150J50
	C13	CCSTH330J50
	C14	CCSTH120J50
	C16, 19, 21	CKSYF223Z50
	C17	CCSUJ080D50
	C22	CEA2R2M35LS
	C23	CEA3R3M25LS
	C24	CCDRH050C50L

Switch Unit (CWS-245)

Mark	Symbol & Description		Part No.
★	D1	LED (MONO)	LN02102GC56
★	D2 — 14	LED	LN01301GC6
★★	S1, 3 — 10, 12 — 16	Switch	CSG-211
★★	S2	Switch (MONO)	CSG-212
	LCD		FTD-6190H
★★	IL1, 2	Lamp	CEL-175

13. PACKING METHOD

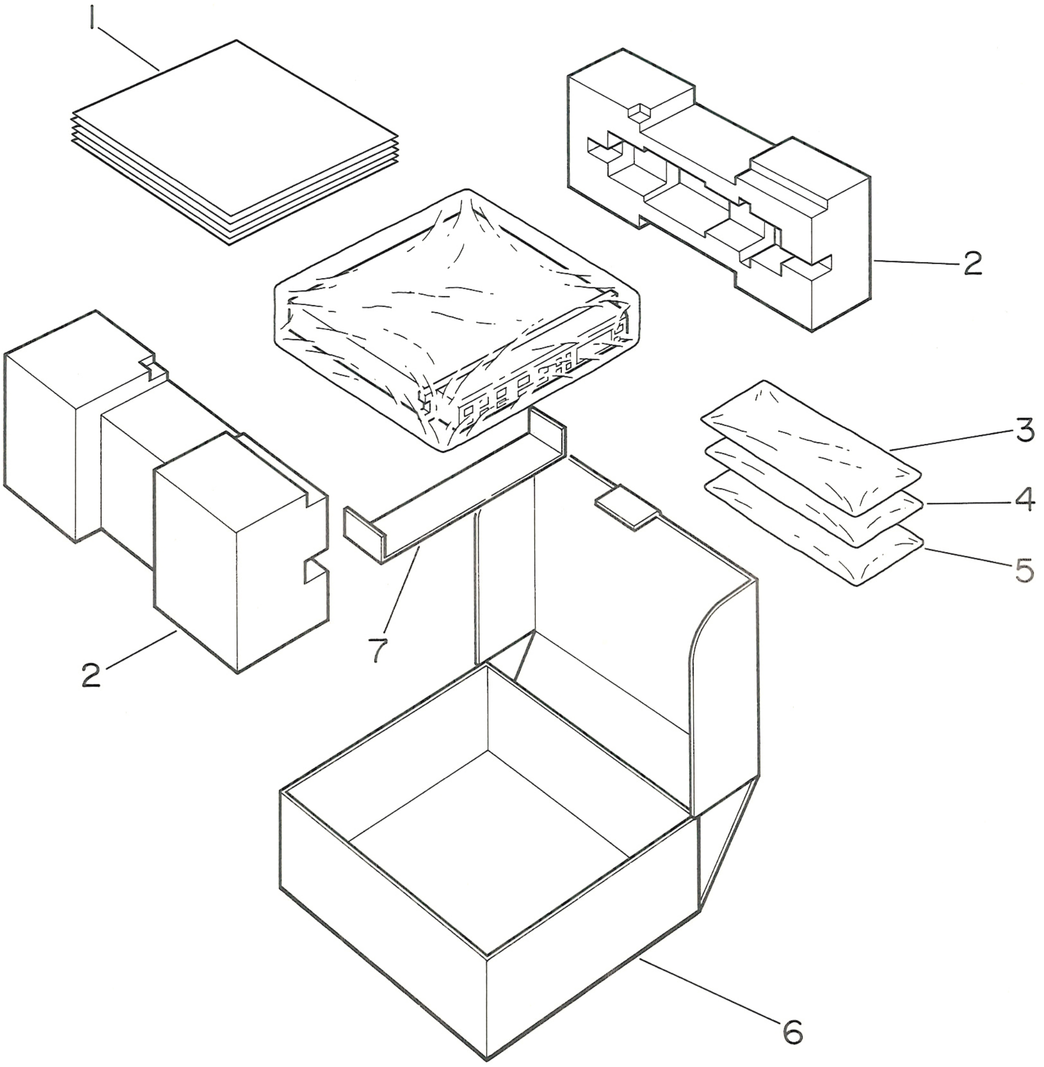

Fig. 26

• Parts List

Mark	No.	Part No.	Description
	1.	CRD1012	Owner's Manual (English, French, German, Spanish)
		CRD1013	Owner's Manual (/EW) (Swedish, Norwegian, Dutch)
		CRB1016	Owner's Manual (/ES) (Arabic)
			Card (/EW)
	2.	CHC-885	Styrofoam
	3.	CDH-048	Sub Feeder
	4.	CDK-308	Cord
	5.	CEA-720	Accessory Kit
	5-1.	CDE-437	Cord
	5-2.		Screw Kit
	5-2-1.	B70-056-A	Nut (M5)
	5-2-2.	CBA-101	Screw (M4×6)
	5-2-3.	CBA-102	Screw (M5×16)
	5-2-4.	CNN-058	Spacer
	5-2-5.	HMF40P080FZK	Screw
	6.	CHF-330	Carton (GEX-007 (MB)/EW)
		CHF-326	Carton (GEX-007/EW)
		CHF-332	Carton (GEX-007 (MB)/ES)
		CHF-328	Carton (GEX-007/ES)
	7.	CNB-720	Mounting Bracket

QUESTIONNAIRE

MODEL ____________________

One Model per questionnaire

Dear Servicer,

Thank you for your cooperation in the post-sale service of Pioneer products.

This questionnaire is used as a tool to improve the serviceability of our products and service manuals. Please evaluate this model and service manual by answering the following questions. Your ideas may be realized in our future products. Your answers will be appreciated. Thank you.

PIONEER ELECTRONIC CORP.

T. Nakagawa, Manager, Service Section, International Division

1. SERVICING EVALUATION

Circle applicable number:	Good		Fair		Poor
a. Disassembly/Re-assembly:	1	2	3	*4	*5
b. Circuit Checks:	1	2	3	*4	*5
c. Replacement of Parts:	1	2	3	*4	*5
d. Adjustment (s):	1	2	3	*4	*5

* If (4) or (5) was circled, please be specific.

e. Your advice, opinion or ideas related to servicing this product.

2. SERVICE MANUAL EVALUATION

a. Circuit & Mechanism Description

b. Circuit Diagram

3. OTHER

Please describe other areas of servicing which you may find difficult.

Completed by :

Date :

Company Name :

Address :

City/State/Zip :

Please send this form filled to the distributor in your country.